CHEMICAL MARKETS

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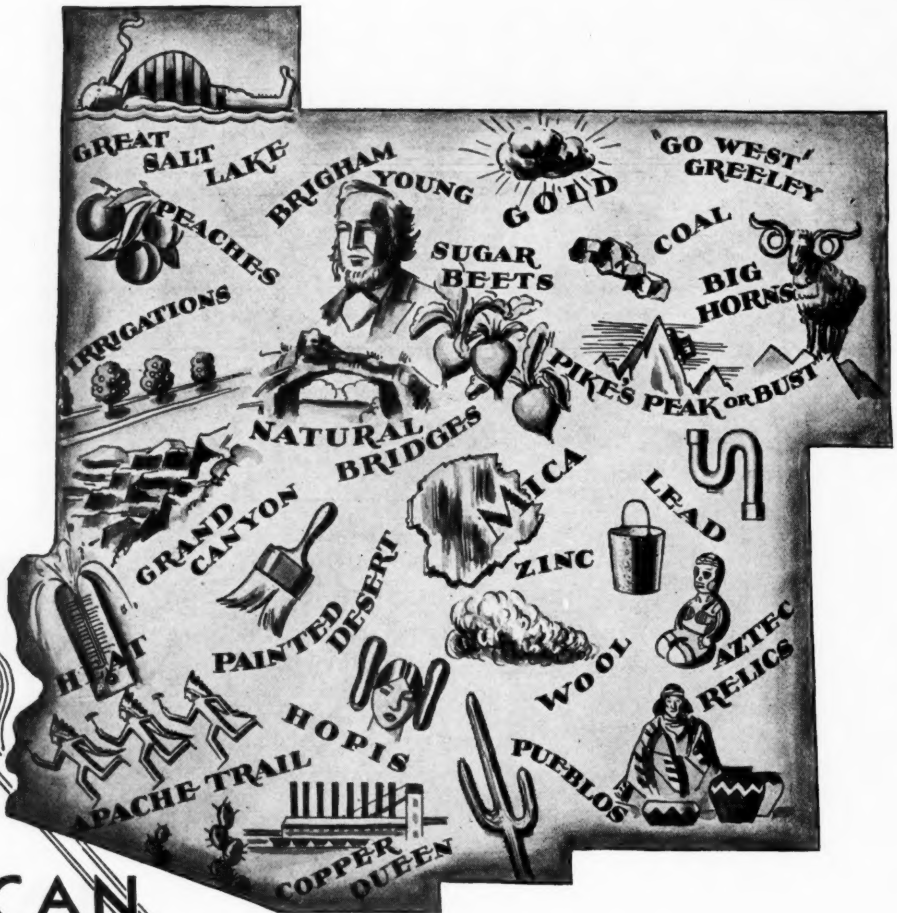
Compensating Changes

Faulty emphasis has been placed upon the swift rate of progress that has characterized chemical development since the World War. Chemical operations, always mysterious to the lay man, have roused his suspicion, and the notion that chemical progress is a dangerous destroyer of values has of late spread widely.

All progress is destructive. Every improvement means a replacement. The destruction of the indigo plantations by the synthetic dysetuff is only a little more dramatic, because of its speedy accomplishment, than the banishment of the horse from our city streets or the passing of clipper ships from the high seas. Moreover, there is almost always a curious compensation in chemical improvements, a transfer of values, a change in uses.

A generation ago the petroleum industry had for its chief product kerosene, replaced to illuminating gas, in turn largely replaced by electricity. But these replacements have each been followed by substitutions that have made the petroleum and the gas industries greater than ever. Celluloid, sorely beset by a half dozen other plastics, has lost many of its markets, only to find a new and fast growing field in the manufacture of laminated glass. Carbon in the automobile batteries disappeared with the coming of the magneto, to find a new place in the radio, only again to be driven out by direct connection, and again to find a new use in the carbo-electrons of the talking pictures.

One of the most distinguishing characteristics of chemical progress is its ceaseless searching for better and cheaper materials. Every new chemical development opens anew the vast and complicated problem of raw materials and by-products. The result is a constant shifting and switching of markets; but the closing of one outlet is usually accompanied by the discovery of some other field of consumption, and rapid as these changes appear to the outsider they seldom come so unheralded that the alert chemical manufacturer cannot anticipate them. Natural products are replaced in toto by chemical substitutes; but within the chemical field proper such revolutions always result in a net gain to the industry.



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Investment Information *Apropos* of the recent flurry in chemical securities, some most amazing statements have eminated from the so-called financial authorities touching upon the plans, policies, and future earnings of leading companies in the chemical industry. To those "in the know" these are sufficiently amusing to deserve quotation.

For example, the Van Strum Financial Service, who for a paltry sum of $76.56 a year will supply inquiring investors with "inside information" sent via air mail, said in their Bulletin No. 855:

> Commercial Solvents also has a new acetic plant under construction which will permit further substantial savings, for acetic acid is an important raw material in the production of butanol. Formerly, necessary supplies of butanol were purchased from other producers. Now the company will not only produce its own supply, but will manufacture it by a new process which will afford further savings.

On February 20th last, the *Wall Street Journal* suddenly went bullish on the fertilizer industry, supporting its position with the following remarkable logic:

> Improvement in fertilizer shares is due to the fact that the selling season is about to open. Although some sections of the country will not be buying as much fertilizer this season as in the past few years, activities of fertilizer people, particularly the American Agricultural Chemical Co., will make for larger use in parts of the country which have only been sparsely fertilized. Furthermore the lower costs of materials will make for enhanced profits for the plant food companies. The fact that Muscle Shoals may soon be manufacturing synthetic nitrates in competition with other companies will greatly help the fertilizer companies who have to buy this commodity for their mixing.

All this is very comical: but it has its tragic side. What the public—especially the investing public—thinks about the chemical industry is a matter of serious concern not only to the industry, but to the future chemical development of the country. For better or worse, the chemical industry has transferred its ownership to thousands of scattered individuals, and the capital for its future expansions must come from the funds of the multitude.

Moreover, it is dangerously easy to purvey misinformation in palatable form about chemicals, and there is already a quite general misunderstanding of chemical functions and chemical operations. Accordingly, erroneous conclusions are very apt to be drawn, as we have recently seen in the case of the decline in alkali prices. Within the month a prominent financial writer has for this reason, warned his readers that Union Carbide profits would be seriously affected, and the same opinion was stoutly held about the Dow Chemical Company by a delightful young lady who visited us recently with a commission to "write up Dow for *Fortune*." The enormity of Dow's alkali losses doubtless seemed the greater to her, since, while she has heard of bromine, she had no knowledge whatever of calcium chloride, phenol, or carbon tetrachloride. The analyst of one of the well known Wall Street houses called us on the telephone only last week and asked what factors are unfavorable to the business of one of the alcohol companies as he was dashing off a review of its position and all he could think of was the curtailment of lacquer consumption in the motor field.

One is sorely tempted to believe that in some cases of this sort—and they might be almost indefinitely multiplied—a little fancy guile is mixed with much of this plain ignorance. This is, of course, the gravest danger. Nothing could be worse for the chemical companies than to acquire the reputation that would soon be won, if their securities become favorites for unscrupulous manipulation. And unfortunately we must admit that they do lend themselves to all this sort of thing.

Now Embargoes Our present legislative dementia is indulging in demands for embargoes. Agitation is rife for import prohibition of manganese, oils, wood pulp and copper. Various reasons are assigned by the advocates of such drastic action based either on humanitarian or strictly economic considerations. Supporters of such action present a plausible plea, one that is likely to sway many. Before we establish a precedent, no matter how pressing the problems that call for solution, let us look further than the length of our nose. Our present tariff is far from popular in foreign countries and embargoes would certainly not improve the present antagonism. No matter how justified such action on, let us say, manganese, would be, it would constitute a powerful weapon in unscrupulous hands bent on the elimination entirely of foreign competition. We cannot very gracefully swallow our former objections voiced at a time when foreign countries a few years back were attempting just this very thing. Let us not permit our tested theories of protection to become polluted with arguments on embargoes. If manganese, or oil, or copper need protection then let these industries attack the problem by the open and accepted method.

Sugar and Research Whether you choose to call it overproduction or underconsumption, the plain unvarnished fact is that we have an over-supply of practically every commodity of any importance. Nor is the situation likely to change in the near future. We have made a number of attempts in the past to regulate output and each have ignominiously failed. Under the impetus of the present world-wide curtailment of consumption we are witnessing further attempts in tin, oil, sugar, and other similar attempts will doubtless be bravely essayed.

As long as human nature remains what it is, there is no effective permanent solution of the problem along these lines. But human ingenuity will solve what human nature cannot accomplish.

Just as we are on the threshold of momentous discoveries in the use of high pressures so will even greater discoveries be made along the lines of fermentation. Such raw commodities as sugar and corn can be profitably exploited through the aid of the research chemist. What has been done with corn can be furthered, and in all probability sugar offers much the same possibilities. At least, if one tenth the effort that is being expended in forcing restriction, were made by the sugar producers towards fostering the development of commercial uses of sugar involving large tonnages, the result would be startling. It is encouraging to hear that such an attempt is at last under way. It should have been started, however, when sugar producers were the envy of the rest of the world. But after all, very few of us prepare for adversity while we are pleasantly suffering from too much opulence.

Muscle Shoals Patents After all the discussion that the latest Muscle Shoals Bill has inspired, it would be but a waste of our readers' time to point out again the follies and injustices with which this legislative iniquity was loaded down by a Congress already famous for its greed and bad judgment.

But there are some broader implications in one of that Bill's most thoroughly objectionable features which bring once more to the foreground the dangers that lurk in our growing disrespect for patent rights. The proposal to give to the operator of the Muscle Shoals nitrate plant free access to any patent useful in the fixation of nitrogen was an obvious sop to bidders. From the practical point of view something of the sort is plainly needed to give the plant even a semblance of economical operation. Yet this provision of the Bill is a ruthless cancellation of the contract between patentee and the United States Government and makes possible a lawless confiscation of private property.

It needs but a couple of laws with such a provision as this to put our patent laws straight in the Volstead class. Already the security afforded a patentee is little enough when in only fifteen per cent of the patent cases which reach the Supreme Court and involve real questions of fact, has the patent in litigation been sustained. Already we see more patents taken out for the avowed purpose of "causing trouble" than for the "advancement of the arts and sciences," which the Patent Law quaintly sets up as its purpose. Already we see patent rights pooled, not to further the practical working of new processes, but for the ulterior motive of competitive advantage.

Dr. Grovesnor, in our issue of exactly two years ago, put his finger on these sore spots in the patent situation and diagnosed the diseases bred from these nasty centers of infection. The germs appear to be incubating very nicely and to have spread their contagion widely.

Quotation Marks

Chemical manufacture has had to live down an unjustly acquired reputation as an especially hazardous occupation. Gradually we are building up a background of safety experience to prove that accident prevention in the chemical industry is not different fundamentally from that in other industries.—*Chemical and Metallurgical Engineering.*

Somebody summed it up in a bright comment by saying: "These depressions find the average man in possession of two suits of clothes. So the duration of a depression is measured by the life of two pairs of pants."—*Bruce Barton Ad-vents.*

Fifteen Years Ago

(From our issues of March, 1916)

Boyer-Kienle Co., New York is organized to conduct a brokerage business at 25 West Broadway.

Daniel Baugh, for many years prominent in fertilizer circles, dies on March 2nd, aged 85 years old.

C. R. Delong is appointed director of the chemical section of the Tariff Commission in place of Dr. Grinnell Jones who remains in an advisory capacity.

Chemist Club (N. Y.) offers sale of bonds to club members to finance purchase of additional property.

Dow Chemical Co., announces the production of ethylene glycol and dichloroacetic acid, the first plant in America to successfully undertake their manufacture.

William S. Gray & Co., lease space in the new Canadian Pacific Building on Madison Avenue, New York City.

Potash

Can the United States Free Itself of Foreign Dependence?

(Part I.)

By George Ward Stocking*

POTASH imports into the United States in 1913 totaled 255,100 tons expressed in terms of potassium oxide. The bulk of these imports came from Germany. A large portion found its way to American soil as a plant food chiefly in the cotton and tobacco-producing areas. With the outbreak of the War imports experienced a marked decline and by 1918 had virtually ceased. The emergency character of the situation thus created was reflected in an increase of approximately elevenfold in the price of potassium salts during the period from 1915 to 1917. To meet this emergency an American potash industry was called into being.

The American war-born industry resorted to a variety of sources in its search for commercial potash. Giant seaweed on the Pacific coast, lake brines in California and Nebraska, cement-mill and blast-furnace dust all were made to yield potash in commercial quantities. But these industries, war-babies as they were, have succumbed for the most part to the more mature, more strongly entrenched and more richly endowed foreign industry. The outstanding exception to this generalization is afforded by the American Potash and Chemical Corporation, which operates with the salt brines of Searles Lake, California, as its raw material and produces potassium chloride as a major product and borax as a by-product. Producing as it did the greater portion of the 66,070 short tons of domestic potash consumed for fertilizer in the United States in 1928 out of a total consumption of 370,400 tons, this concern has given convincing evidence of its capacity to survive in competition with foreign potash. Despite its achievement in this regard, however, the Searles Lake industry offers no great promise of freeing the United States from dependence upon foreign potash as the major source of supply. From a business view-point, its capacity to produce potash seems to be limited by its ability to dispose of its by-product, borax. Although the market for that product will in all probability experience expansion with the passing of time, it can scarcely be expected to expand with sufficient rapidity to enable the Searles Lake enterprise to supply all the potash that America will need.

Professor Stocking is one of the foremost American authorities on potash. In the summer of 1929 he spent several months in Germany and France investigating at first hand conditions abroad. In this, the first of three articles, he reviews the foreign situation. The other two are devoted to developments in the United States. We believe these articles to be the most comprehensive review of the international potash situation yet to be published in this country.

The recent discovery of deposits of polyhalite in the Permian salt beds of West Texas and of sylvinite in southeastern New Mexico in what are believed to be commercial quantities and the entrance of private capital into both these fields for purposes of commercial exploitation are thought to give promise of meeting in large part the domestic deficiency in the supply of potash. This promise of American independence of foreign potash makes appropriate a consideration of the developments in the foreign industry since the War and of its competitive strength. With this topic the present article will deal. In subsequent articles more detailed attention will be given to the prospects of a potash industry based on the potash deposits found in the Permian salt beds of the Southwest and to the problems which such an industry may encounter.

Although foreign potash put the young American industry on the run with the resumption of imports following the War, nevertheless the close of the War

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Potash storehouse in Antwerp, Courtesy Berliner Tageblatt

found the German industry in a sadly demoralized state. The extent of its demoralization can best be pictured, perhaps, by the presentation of a few pertinent statistical facts. In 1913, 164 shafts designed for the mining of potash were available for operation in Germany, including those of Alsace. At the close of 1920 the number of completed shafts in German territory alone totaled 201. The sale of German potash salts in 1913 amounted to 1,110,369 metric tons of K_2O as compared with a total of 923,657 tons in 1920. This represented a decline in the average sales per shaft from 6,770 tons in 1913 to 4,559 tons in 1920. Despite a marked decline in output and an increase in capacity, the number of workers in the potash industry (and the closely allied salt industry) had increased from 32,258 in 1913 to 51,426 in 1920.

War Breaks German Monopoly

Moreover, individual mines and the industry at large were suffering from a shortage of capital and from deterioration of equipment. They were over-manned, under-equipped and under-operated. A situation distracting from an industrial point of view had become distressing from the business viewpoint as a result of the breaking of the German world monopoly in potash production through the loss of Alsace-Lorraine and the consequent separation of some of the richest of the German potash deposits. With such vigor had the French mines attacked the world market that although the German mines in the lost territory had produced but 58,000 metric tons of potash in 1913, the French output in 1920 from the same area totaled 192,480 metric tons.

How German Industry Developed

To understand the post-War demoralization in the German potash industry, attention must be given to the system of control under which it had developed. German potash is found as water-soluble salts, for the most part as potassium chloride, deposited in the ancient Zechstein sea which covered central Germany in geologic ages long gone by. In contrast with the American system of mineral ownership, property rights to sub-surface minerals in Germany (save in the province of Hannover) belong to the various German states. It was not until 1865 that the German States under the leadership of Prussia took the first step in throwing their mineral resources open to unrestricted private exploitation. A few years earlier, in 1861, potash had been discovered near Stassfurt in a mine sunk by the Prussian fisc in a search for more abundant supplies of salt, the production of which was then a State monopoly. By this time the need of fertilizers on German soil had been recognized and a technique was readily forthcoming for the refining of the so-called "abraumsalz," at first disposed of as a waste product on the hillsides adjacent to the salt mines. Before the end of 1862 the Duchy of Anhalt had completed an additional shaft for the mining of potash. For thirteen years thereafter the potash business remained an enterprise of the State.

Following the revision of the Prussian mining laws, which threw open to private exploitation the mineral resources of the State, private capital entered upon an energetic search for potash deposits. By 1875 a private concern had completed a shaft for the mining of potash salts, and two years later a second privately-owned mine was in operation. Competition between the two State works and the private works resulted in a demoralization of the market in potash salts with the result that under the leadership of the Prussian fisc the four works entered upon an agreement in 1879 under the terms of which the total production of potash was limited, the price of potash salts increased by some 25 per cent, and the market allocated among the four concerns. This agreement marked the formation of the first fiscus potash cartel. From this date until the passage of the Potash Law of 1910, with minor interruptions, the German potash industry functioned under the guidance of a monopoly control of the voluntary cartel type. The major functions of the cartel were restriction of output, allocation of total production among the constituent members of the syndicate, and determination by the syndicate of the prices at which the various potash salts could be marketed. In

brief, competition in the sale of potash salts was completely eliminated. Although cartel administration of the industry involved concentration of control over matters of output and price, it did not carry with it concentration of production, nor did it set up any check on new capacity. On the contrary, each separate constituent of the cartel remained a separate, independent unit for operating and business purposes. The speculative character of potash production, the promise of rich reward which it offers to those who may find deposits of richer character or greater accessibility, coupled with the monopolistic nature of the prices at which the product was marketed, served to bring into the industry a tremendous supply of new capital during the period from 1890 until the beginning of the World War.

Five Years of the Syndicate

By 1909 there were 53 mines possessing quotas for the mining of potash, allotted to them by the syndicate. By 1910 the number of quota-bearing shafts had grown to 62. With an increase in the number of quota-bearing shafts, the syndicate experienced greater difficulty in maintaining its existence. New mines meant a demand on the syndicate for production quotas and a decrease in the quotas of those mines already in operation. It was with difficulty that the syndicate agreement of 1904 had been renewed. Inability to agree on the size of quotas to be allotted to the constituent members resulted in the temporary breakdown of the syndicate upon the expiration in 1909 of the five-year agreement of 1904. Failure to renew the syndicate resulted in the making of contracts by several of the former leading syndicate members with the major American purchasers for the delivery of large amounts of potash at prices from 18 to 49 per cent below previously prevailing syndicate prices. Monopoly in the sale of German potash products was thereby temporarily broken.

State Assumes Control

The outcome of this development was the passage by the German Imperial Government of the Potash Law of 1910 and the bringing of the industry under definite State control. Briefly, the law provided for the organization of a syndicate, membership in which from a practical viewpoint was compulsory. The new syndicate was to function as a regulator of price and an allocator of production as had the syndicate of old. Allocation of output was to be on a basis of capacity to produce. Aside from preservation of the monopoly conditions under which German potash entered into the world markets, the major consequence of the law of 1910 seems to have been a tremendous increase in capacity. Production in 1910 had been distributed among 62 different mines. As previously stated, by 1913 there were 164 quota-bearing shafts in existence. By 1920 that number had increased to 201, despite the loss of 17 shafts to France through the cession of Alsace.

Aside from its effect on price, the economic consequences of pre-War cartel control, permitting as it did entrance into the industry of all those attracted by its speculation problems, seem to have been an increase in capacity far beyond the demands of the market, the perpetuation of an inefficient and obsolescent technique in the mining and refining of potash salts, and the continuance of production from deposits inferior in their chemical composition and potash content. In short, the major effect seems to have been an increase in the cost of production, an increase which, though it cannot be accurately measured, seems to have been of no insignificant proportions. Between 1900 and 1920 the number of quota-bearing mines increased with greater rapidity than did the market for potash salts. The inevitable consequence was a decrease in the average scale of operations on the part of the producing mines. With production scattered over a large numberof units and with average production on the decline, there was little incentive to adopt improvements in mining and refining methods the profitability of which depended upon large-scale output. As a result, the German potash industry was composed of a large number of small, inefficient units. Nevertheless, prices of a monopoly nature, coupled with the speculative charac-

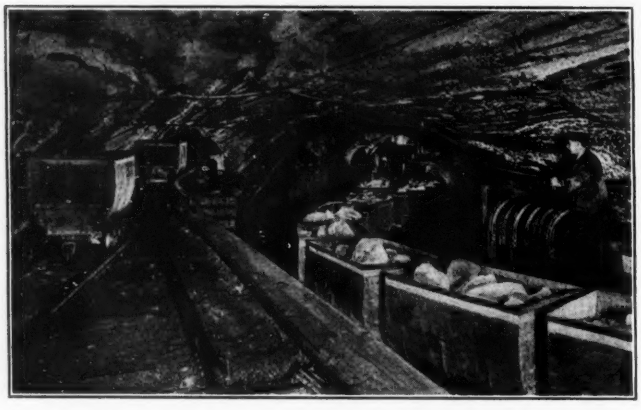
Plant of the Berlepsch-Mayback Mine near Stassfurt, Germany. Left to right, superintendent of the mine, the author and a representative of the Syndicate

ter of the industry, made it an attractive field for new capital. That capital flowed in with vigor and abandon is evidenced by the increase in production capacity, as set forth above.

In these developments lay the basic causes of the demoralization under which the German potash industry suffered at the close of the War. Since that time German industry at large has undergone a reorganization of such thorough and comprehensive character that it has appropriately been designated as "the new industrial revolution." In the forefront of those German industries which have experienced the invigorating touch of Germany's program for the "rationalization" of her industrial life stands potash.

Reorganization of the Industry

Although the first official steps towards reorganization of the German potash industry were taken under the leadership of the Socialists shortly after their advent to power, the movement was carried forward with the assistance and under the guidance of the business men whose property rights were at stake. The Law for the Regulation of the Potash Industry, enacted April 24, 1919, by a Socialist government in accordance with the more general provisions of the Socialization Law of March 23, 1919, together with the subsequent regulations for carrying the law into effect, provided for the creation of the Potash Council consisting of representatives of the owners of potash mines, of the laborers in the potash industry and industries whose raw materials were secured from the potash industry, representatives of the consumers of



Underground transportation system in the Berlepsch mine at a depth of 406 meters

potash, and technical experts. This board was designed to act as a sort of parliament for the potash industry. In practice, its major function has been the regulation of potash prices, subject to the veto of the Minister of Economics. More important as a factor in placing the potash industry on a higher plane of economic efficiency were those requirements of the law of 1919, together with its subsequent amendments, which provided for the abandonment of inefficient mines upon order of the Potash Examining Board, a board subsidiary to the Council created under the law of 1919. As it has worked out in practice, no mines have been closed under compulsion. Abandonment of mines has taken place through the transfer of production quotas from the less efficient mines to the more efficient mines. The machinery for the transfer of quotas had been created by the combination movement which had manifested itself even before the outbreak of the War, a movement which was greatly accelerated during the period of the depreciation of the mark between 1919 and the autumn of 1923 and has continued apace until about 1928.

Underground loading and transporting of potash salts by means of the shaker-conveyor

The effectiveness with which the movement has been carried forward is indicated by a brief résumé of a few statistical facts. At the beginning of the War the industry was under the control of 11 independent companies and 33 concerns each, representing a combination of two or more units. The largest of these combinations controlled but 9½ per cent of the total output. By 1928, however, three concerns controlled 81 per cent of the production, and rumors were current of the consolidation of these three into a single trust which would absorb the remaining 19 per cent of output under state and independent control.

Decrease in Number of Mines

Theoretically, the law of 1919 provided for the sale on the open market of production quotas of those works which proposed to close down permanently. In practice, quotas have been transferred for the most part within the combinations which have come to dominate the industry. Concentration of control, in brief, has brought with it concentration of output. The more uneconomic mines have been abandoned permanently, their right to produce potash under the quotas allotted them under the syndicate organization having been transferred to more efficient mines. So rapidly had this movement progressed that between 1921 and 1928 the number of mines in operation decreased from 155 to 60.

Such concentration of output has made possible the introduction of improved methods of production. Men

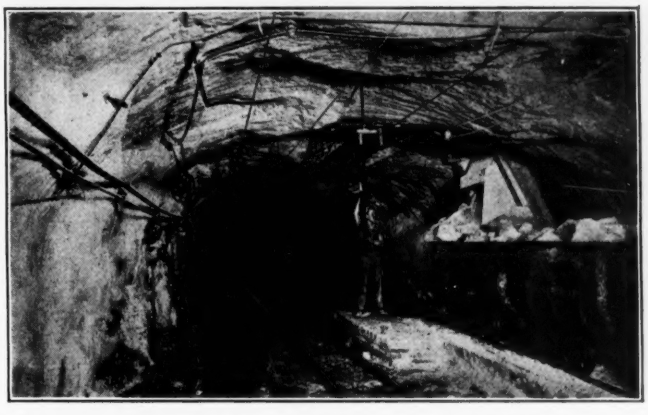
have given way to machines; machines have been perfected and enlarged. Transportation facilities for hauling salts from the face of the underground deposits to the main shaft have been extended and improved. The cable-drawn wagons have given way to the electric locomotive, and the shaker-conveyor has in many cases been substituted for the mine wagon with a consequent reduction in labor and cost of loading. In other mines hand loading has been completely superseded by the introduction of the simple device of the self-loading, electrically propelled scraper.

Plant of the Berlepsch-Mayback Potash Mine near Stassfurt, Germany

The Wintershall concern with 39 per cent of the total production is now loading 85 per cent of its output mechanically. Backfilling, previously a matter of mine wagons hand-filled with refuse from the factory, has given way in the Hannover district to the so-called *Spülversatz*, by means of which the semi-liquid factory refuse is pumped into the empty chambers. Not only is labor thereby eliminated, but once the gob hardens, supporting pillars can be pulled and the mine thus completely stripped of its potash salts. Increased output has called for more power and has necessitated the installation of larger electric units, but these, once installed, have meant cheaper power through lower cost per unit of capacity. These numerous developments are reflected in an increase in K_2O output per man per shift of from .198 tons to .417 tons between 1924 and 1928.

Progress in Refining

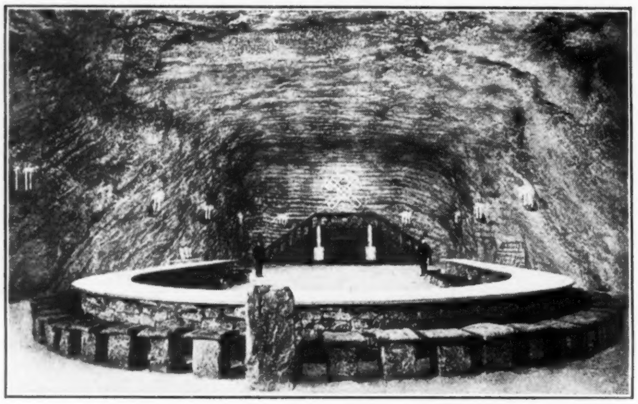
Similar progress has been made in the mechanical processes of refining the crude salts. The raw salts consist of sylvinite (KCl, NaCl), hartsalz (NaCl, KCl, $MgSO_4$, H_2O), and carnallite (KCl, $MgCl_2$, $6H_2O$). For the concentration and separation of the potassium chloride in the raw salts, 75 refining plants were in operation in 1921. By 1928 this number had been reduced to 31. This has meant an increase in the average amount of raw salts handled per factory per year from 92,500 long tons to 327,500 long tons. Large-scale operations have virtually forced the introduction of improved methods. Large-scale production is made possible by and likewise necessitates a co-ordination of processes—literally, a flow of materials from their raw state to the finished form. The old refining process was characterized by starts and stops; the new, by continuity. At every stage of the refining process lost motion has been eliminated, and machines have driven out the handworker. The major processes involved are the dissolution of the salts, the crystallization of the potassium chloride and its drying for sackage, shipment or bulk storage. Formerly the crude salts to be dissolved were dumped into dissolving kettles which, after dissolution of the salts, were emptied to be refilled with liquor and salts. The newer process is continuous, the salts and the dissolving liquor entering from opposite ends of the dissolving tank or trough and then mixed by means of a revolving screw which likewise pushes the undissolved residue to the discharge outlet of the tank. The old process could handle about 300 long tons of crude salt per day. The newer process does the same work in little more than an hour. Under the old process, crystallization took place by cooling in vats emptied by hand at the close of the process, which involved from two to four days. Here again the newer methods are continuous. The solution from the dissolving tank is led by pipe to the decantation tanks and as the suspended solid matter settles to the bottom, the liquid is led into vacuum coolers and thence to spray cooling towers. All hand labor is eliminated, and the newer process releases the heat of cooling to be utilized in pre-heating the mother liquor for the original dissolution process. Similar improvements have been made in the substitution of revolving drum dryers for the stationary drying ovens.



Potash mined at a higher level being loaded into mine wagons by means of a chute

Once more the result has been that a day's operation has been crowded into an hour. And, finally, a rationalization in the use of heat and power for driving the whole plant has led to great savings in the use of fuel. Fuel consumption in the German potash industry decreased from an average of 3.3 tons of crude lignite per ton of K_2O produced in 1922 to 1.5 tons per ton of K_2O in 1928.

Such, in brief, are a few of the economies which the reorganization of the German potash industry since the War has introduced. They have permitted the industry to sell potash fertilizing salts in the domestic market at only 15.6 per cent above the price of 1913 and in foreign markets at substantially the pre-War price in the face of a 90 per cent increase in wage rates, a 31.4 per cent increase in the price of coal, a 34.4 per cent increase in the price of structural iron, and a 21.5 per cent increase in the price of machine oils.



Workers' banquet hall cut out of solid salt rock

On the whole, the German potash industry apparently finds itself in a stronger position today than at any time in its history. This is true despite the loss of seventeen of the best of the German mines to France as a result of the cession of Alsace-Lorraine. Although at the outset the French industry entered into vigorous competition with the German industry to secure its share of the world market, in 1924 a temporary agreement was entered into between the German and French industries under the terms of which the American market was to be divided between the two industries, 67.5 per cent of American sales being allotted to the German industry and 32.5 per cent to the French. This agreement was broadened in May, 1925, the entire world market being divided between the German and French industries in the proportion of seven to three. These temporary agreements were superseded in April, 1926, by a ten-year agreement similar in scope and content. Under this agreement competition between the French and German industries in the world markets for potash is completely eliminated. Output and price are subject to agreement by the syndicates representing the two industries. That the prices which have prevailed allow ample opportunity for profitable sales is indicated by a dividend rate of 12 per cent paid by the Wintershall concern on its common stock since 1925; a dividend rate of 12 per cent in 1925 and 1926 and 15 per cent in 1927 by Salzdetfurth; a dividend rate of 10 per cent since 1925 by Westeregeln; 10 per cent by Aschersleben; and 10 per cent for 1925-27 and 12 per cent in 1928 by Krugershall. Foreign monopoly control of the potash industry in the world's markets makes attractive the development of an American industry adequate at least to supply the domestic demand. To the prospects of such an industry we shall turn in our next article.

Foreign

Melchett Will

London—The late Lord Melchett, who was thought to be one of the richest men in England, left a fortune of only $2,500,000. Most of what is left after death duties have been deducted will be distributed among his family.

His son, the new Lord Melchett, is expected to receive half of the estate, as well as Melchett Court, a beautiful country home in Hampshire, from which the great industrialist took his title when he became a peer. The Melchett estate on the shores of Lake Tiberias in Palestine will go to Lady Erleigh, daughter of Lord Melchett and the daughter-in-law of the Marquess of Reading, and the wife of the new president of Imperial Chemical Industries.

Lord Melchett's will contains no bequests to charity, it is understood, for the reason that he made lavish gifts during his lifetime.

Tin Producers

The Tin Producers Association issued the following announcement during the month: "The executive committee of the Tin Producers' Association announces that no credence need be attached to the rumors which are circulating to the effect that plans for international regulation of tin output had broken down. As is well known governments of Bolivia, Netherlands, East Indies and Nigeria have declared their readiness to accept and operate quota scheme. The Malayan Government a short time ago issued a circular to the mining industry in Malaya inviting their opinion.

In connection with the restriction scheme, the British government through the Secretary of State granted its approval as follows:

"His Majesty's government has approved in principle of the Malayan States and Nigerian governments passing the necessary legislation to regulate the production and export of tin with effect from March 1, 1931.

"The approval is subject to the Secretary of State being satisfied as to the details of the international scheme and negotiations with the representatives of the Netherland East Indies Government and of the Bolivian Government and as to the understanding that the work of the restriction scheme is controlled by a committee of representatives of the four governments concerned—Nigerian, Malayan States, Dutch East Indian and Bolivian—by which the consumer will be protected against any excessive rise in price."

Sulfite Cellulose

Members of the international agreement in sulfite cellulose, which was arranged last November by six European nations, have met in Vienna.

Resolutions were drawn up by members which call for enlarging the agreement. Producing nations which joined the pact last year were, Germany, Sweden, Norway, Finland, Memel and Czechoslovakia. The agreement calls for a production of no more than 85 per cent of the 1929 output, effective from October 1, 1930, and running to the end of 1932. Only plants in existence on October 1, 1930, are affected.

Total cellulose production capacity by the countries mentioned amounts to around 3,000,000 tons annually. Cellulose for rayon is not included in the pact.

Electrolytic Zinc — New Production Methods Revolutionize An Old Industry

Employing the new Evans-Wallower plant as an example, Doctor Cuno describes the advantages of the electrolytic over the smelter process in the refining of zinc.

By Dr. Charles W. Cuno*

THE Evans-Wallower Zinc Company electrolytic plant now in operation for almost a year, at Monsanto Village, Ill., is of a special interest, not only because of its many novel engineering features, but also because it is an excellent example of the cooperation of industries where the by-product of one plant becomes the raw material of another.

Electrolytic zinc production was first undertaken in this country on a large scale by the Anaconda Company during the War. The price of zinc at this time reached extravagant levels, and all the metal produced by the Anaconda Company for the first year or two was sold at prices between \$600 and \$800 per ton. After the War the demand for high-grade zinc declined and although the Anaconda plant continued in operation, no other plants were built in this country until 1927 when the Bunker Hill & Sullivan Company, Kellogg, Idaho, erected a plant to use the Tainton process devised to overcome difficulties encountered in electrolytic zinc practice. The Evans-Wallower plant uses this Tainton process and is designed to treat concentrates from the Joplin district.

First to Use Electrolytic Process

Hitherto all of this concentrate, the major source of our zinc supply, has been treated by the old process of smelting in zinc retorts, and the plant at Monsanto is the first to treat these ores by electrolytic means. Previous electrolytic zinc plants had been located to take advantage of cheap hydro-electric power, remote from the principal distributing points and from markets for sulfuric acid, and the sulfur dioxide which is obtained in the roasting process had to be wasted.

In 1928 the management of the Evans-Wallower Zinc Company became satisfied that Joplin ores could be successfully treated at East St. Louis by the electrolytic process. Besides the large local consumption of zinc and of sulfuric acid, and the advantages of St. Louis as a distributing point, a principal reason for location at this point was its proximity to the sulfuric acid plant of the Monsanto Chemical Works, where the sulfur dioxide, produced as a by-product of the roasting of zinc sulfide, could be used directly in the manufacture of sulfuric acid. The second most fortunate circumstance was, that the large powdered coal station of the Union Electric Light and Power Company, a few hundred yards away, supplied needed electric power under economical conditions.

The main electrolytic plant occupies ten acres, immediately adjoining the Monsanto grounds. The roaster plant is situated on Monsanto property close to the contact acid plant. The gases from the furnaces, after purification, are passed over to Monsanto and mixed with other gases obtained from the burning of sulfur for the manufacture of various grades of sulfuric acid.

Zinc concentrate, usually obtained in the tri-state district, contains, besides the zinc sulfide, small amounts of cadmium, copper, lead, iron, gold and silver, and traces of the rare metals. Most of the concentrate is obtained by the flotation process, for which it is already ground to approximately 200 mesh. The concentrate is first unloaded into one of six bins, each 400 tons capacity, so that various kinds of concentrates may be stored in quantity and mixed to provide the proper feed for the furnaces.

Drying and Roasting of Concentrates

From the bins the concentrate goes to two Lowden dryers, each with a plate area of 9 x 28 feet, where the moisture content is reduced from an average of twelve down to one or two per cent. The dried concentrate

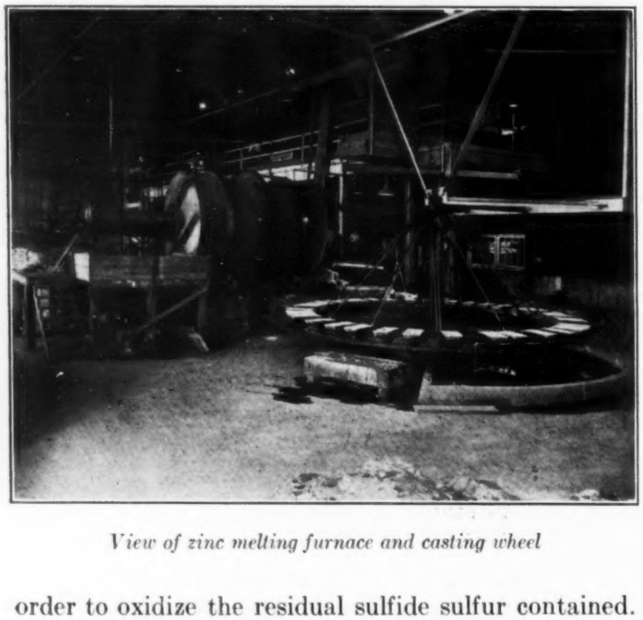
*Consulting Chemical and Metallurgical Engineer, Industrial Bureau of the Industrial Club of St. Louis

goes by means of elevators to the feed hoppers of three Wedge furnaces, each of 25 feet external diameter, and having seven roasting hearths and one drying hearth. The various concentrates are mixed to produce a uniform feed, carrying about 45 per cent zinc and 29 per cent sulfur. The draft in the furnace is so arranged that the gas from the upper five hearths goes upwards and is used in the manufacture of acid. The gas from the lower two hearths, being very weak in sulfur dioxide, is exhausted to the air through a 150-foot stack.

A Mahr oil burner is provided on the sixth hearth, in order to maintain temperatures sufficiently high in the later stages to insure a good roast. The calcine from the furnaces drops to a drag-chain conveyor, which takes it to the crushing and screening department, the oversize being crushed in a ball mill and returned to the roaster, while the fines are transferred to the leaching plant.

From Furnace to Precipitator

The gases leave the furnace at a temperature of about 800° C. and pass along a brick-lined steel flue, having a drag-chain in the bottom of it to collect the dust that settles out. The last part of the flue is unlined in order to allow the gases to cool down to a temperature of 400° C. where they enter the Cottrell precipitator. The Cottrell precipitator is of a plate and wire type, is automatic, and the plates are maintained at a voltage of 80,000 with 0.5 ampere current. The product from the Cottrell, together with the flue dust, is returned to the lower hearths of the roaster in



View of zinc melting furnace and casting wheel

order to oxidize the residual sulfide sulfur contained.

Great care is exercised in maintaining a uniform composition of the furnace gases, because of the requirements of the sulfuric acid plant. The gas should be at all times above 5.5 per cent SO_2. Normally the average lies between six and seven per cent, occasionally going as high as nine per cent. Tests are made every hour to determine the gas strength and a recording sulfur dioxide meter is included in the circuit for comparison and check.

The calcine from the roasters carries sulfide sulfur to the extent of 0.3 to 0.5 per cent and is separated

General view of the Evans-Wallower Electrolytic zinc plant at St. Louis

into two parts by means of magnetic separators. These are two in number of the Dings-Wetherill type, with a 20-inch belt, having a capacity of 75 tons per day.

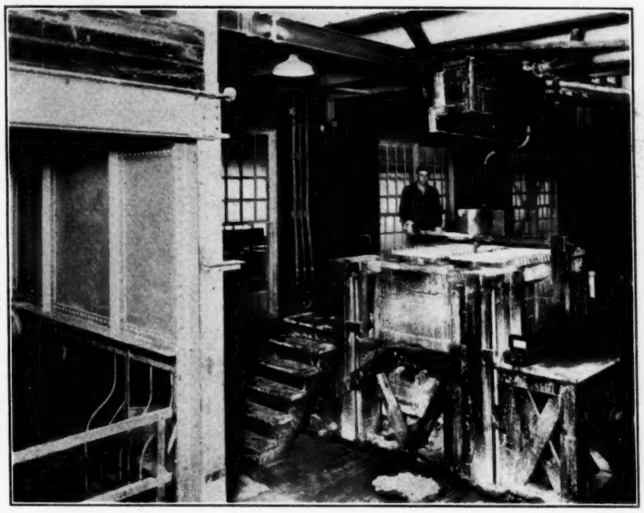
The Leaching Process

The magnetic portion contains almost all of the zinc sulfide, together with the zinc and copper ferrite. The leaching process is carried on in agitators 20 feet in diameter by 14 feet six inches high. These are constructed of wood, lined with lead, and provided with stirring mechanism individually-driven by 15 horsepower motors. The agitators are first charged with about 80 volume tons of return electrolyte at a temperature of 60° C. and containing about 28 per cent sulfuric acid. The ferrite portion is then added and agitated for about an hour, whereby most of the relatively insoluble zinc compounds are decomposed. Crushed manganese dioxide ore is then added to oxidize all the dissolved iron to the ferric state. Then the non-magnetic portion of the calcine is added slowly until the acid is neutralized and all of the iron precipitated. The neutralized mass is pumped to four Burt filters, each five feet in diameter by 40 feet long. These filters each produce about 125 tons of solution in 24 hours, which is sufficient for the production of about 18 tons of cathode zinc in the cell room. The residue contains the silica and iron originally present, together with the lead, silver and gold. This residue is re-pulped with water and sent to the residue treatment plant. It is de-watered and dried for shipment to the lead smelter.

Plans call for the erection of a leaching plant for the treatment of this material and the production of electrolytic lead, silver and gold.

Purification of Electrolyte

The solution from the Burt filters contains the dissolved zinc, cadmium, copper, cobalt and nickel. It is pumped to a storage tank 22 feet in diameter by 14 feet high, and is drawn, as required, to purification agitators, where it is treated with zinc dust. This precipitates all the metals except zinc. When tests show precipitation to be substantially complete, the solution is pumped through Shriver filter presses, three in number, having 36 plates 36 inches square. The precipitated copper, cadmium, etc., is dropped to a storage bin for treatment in the cadmium plant, while the solution goes forward to two storage tanks, each holding 150 tons of solution, known as check tanks. From each batch of solution a sample is sent to the control laboratory for checking as to its purity. When the solution is certified as to its proper quality, it is pumped to the neutral storage tanks from which it travels to the cell room as required.



View of cadmium cell. The electrolytic process makes available many elements lost in the older processes of refining

Cadmium Plant

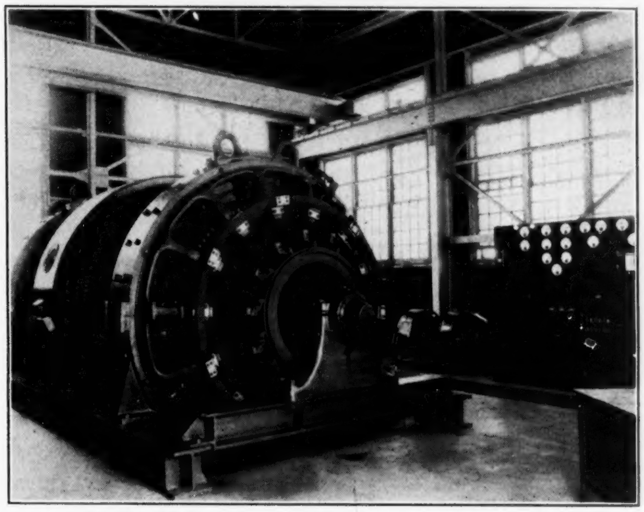
The copper-cadmium cake from the filter presses is treated with acid in an agitator tank until the cadmium is in solution, while the copper remains undissolved. The mixture is then filtered, separating a high-grade copper product, which is shipped to the smelters. The solution containing the cadmium goes to an electrolytic cell, in series with the main electrolytic circuit, which is capable of producing 1,000 pounds of metallic cadmium per day. After 90 per cent of this cadmium is precipitated the solution is either returned to the leaching circuit, or is again used for dissolving a fresh batch of cadmium. The cadmium metal is stripped at intervals from the cathodes, and then melted down under high flash-point oil and cast into slabs weighing about 100 pounds. These slabs are assayed for purity and then recast under molten caustic soda into final form for market. A large part of this cadmium is used in the plating industry.

Precipitation of Zinc

The main cell room contains 190 cells, each containing 12 cathodes and 24 anodes. The cathodes are of aluminum sheet, 0.156 inches thick, and have an immersed area of eight square feet, counting both sides. Each cathode takes 833 amperes at full load. The anodes are of the grid form, and are composed of silver-lead alloy containing one per cent silver. Current is supplied by a motor generator set, capable of delivering 10,000 amperes at 600 volts. Power is supplied at 13,200 volts through an underground cable directly from the switchboard of the Cahokia power plant.

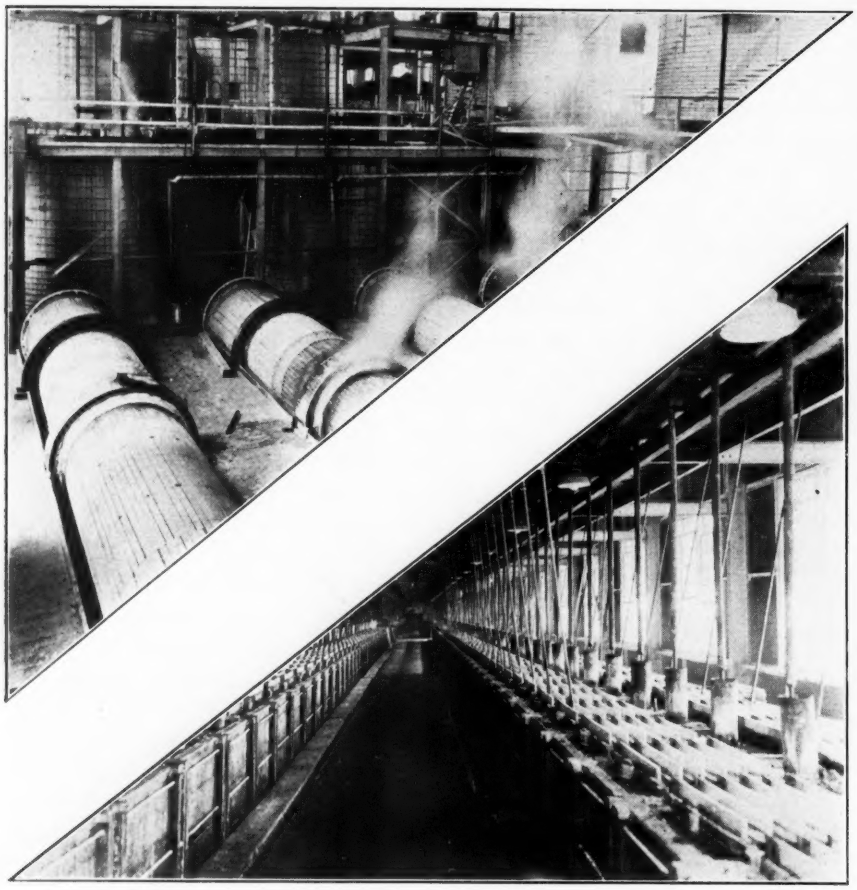
In the basement of the substation is the necessary equipment for supplying 100,000 cubic feet of water-washed air per minute for cooling purposes. The cells are set in two rows of 95 cells each, and provided below with sumps running the full length of the row.

During electrolysis the solution in the cell circuit is circulated continuously through the cell and down to the sumps, whence it is lifted by two pumps, each of a capacity of 1,500 gallons per minute. The solution then flows through the cooling system, which consists of lead coils through which water is circulated, thence it flows to two long landers, from which it drops through hard rubber pipes to the cell, where it overflows and goes around the circuit again.



View of the power facilities of the plant

Zinc is stripped from the cathodes at intervals of from 12 to 16 hours, and is then returned to the melting furnace below. This furnace consists of a brick-lined steel drum, six feet in diameter by ten feet long, inside measurement. It is driven by a central



Left: Burt filters with the purification and storage tanks in the background

A cell room at the St. Louis plant. Electrolytic zinc is of the highest purity

gear at a speed of one revolution per minute. Heating is done by means of gas, but this will ultimately be replaced by electric heat. The molten metal is tapped out from time to time into a ladle of one-ton capacity, and thence to a casting ladle which fills the moulds on the casting wheel. After water cooling, the zinc is ready for storage, where it is held until analysis is received from the laboratory. All zinc leaving the plant is guaranteed to be of purity at least of 99.99 per cent.

The production of electrolytic zinc, as commercially carried out, represents in a sense a contravention of the laws of nature. Thermodynamics indicate that the electrolysis of an aqueous solution containing zinc and free acid should yield hydrogen, and only hydrogen, at the cathode. That it does not do this is due, of course, solely to the fact that the hydrogen overvoltage at a pure zinc surface exceeds, under certain conditions, the potential necessary for the separation of zinc.

There are a great many factors which can disturb this condition, and so allow the normal reaction, namely the decomposition of water, to assert itself. Hydrogen overvoltage is adversely affected by increasing temperature, so that in commercial work it is necessary to hold the electrolyte temperatures within definite limits. It is also lowered by decreasing current density, and since the surface area of a zinc deposit continually increases as it becomes older, a definite limit is set to the thickness to which deposits can be carried. Another vital factor relates to the presence of certain impurities in the solution, which may be deposited with the zinc and lower the overvoltage below the critical point.

The essential difference between the Tainton process and others now in use is the high current density, the high concentration of acid, and the special methods used in purifying the electrolyte. Special apparatus has been developed for these conditions, and the equipment used, especially that for leaching and electrolysis, shows many departures from that of other processes.

An interesting feature of this process is the precipitation of manganese dioxide during electrolysis. This manganese dioxide is formed by the intersection between manganese sulfate in the solution and permanganic acid formed at the anodes. It settles to the bottom of the cells, and is cleaned up from time to time, washed and dried for market. The manganese dioxide is high in available oxygen, and completely free from elements such as copper, nickel, antimony, etc., which lower the hydrogen overvoltage at a zinc surface. These qualities are those most desired in the manufacture of dry cells of high capacity and long shelf life.

The electrolytic zinc process as compared with the older retort method offers the following advantages: a higher grade of metal; a higher extraction of zinc; the treatment of low-grade materials which cannot be treated by smelting; a number of important elements in the ore which are ordinarily lost in the melting operation.

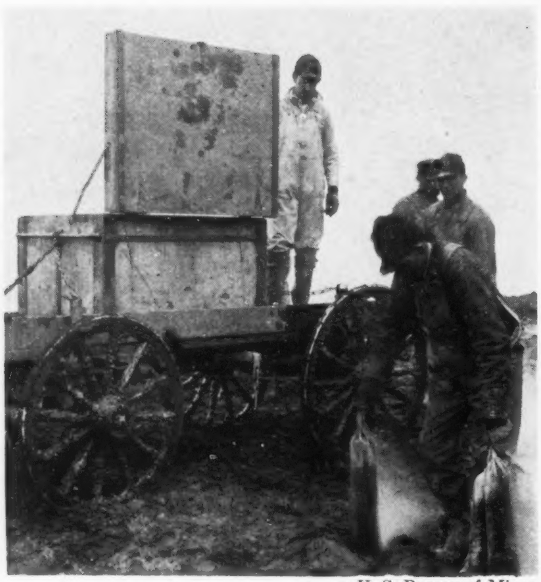
This plant makes available for commercial use the following constituents of zinc concentrates: sulfur, zinc, cadmium, copper, lead, silver, gold and manganese. Other elements, such as germanium, thallium, indium and gallium, can be added if sufficient market can be found to warrant their commercial recovery.

(The author wishes to acknowledge the courtesy of Dr. U. C. Tainton and the management of the Evans-Wallower Electrolytic Zinc Plant for much of the material here presented.)

CHEMICAL N

Photographic Record of

Additional honor. Dr. Charles L. Reese is elected chairman of the reorganized Board of Directors of the American Chemical Society



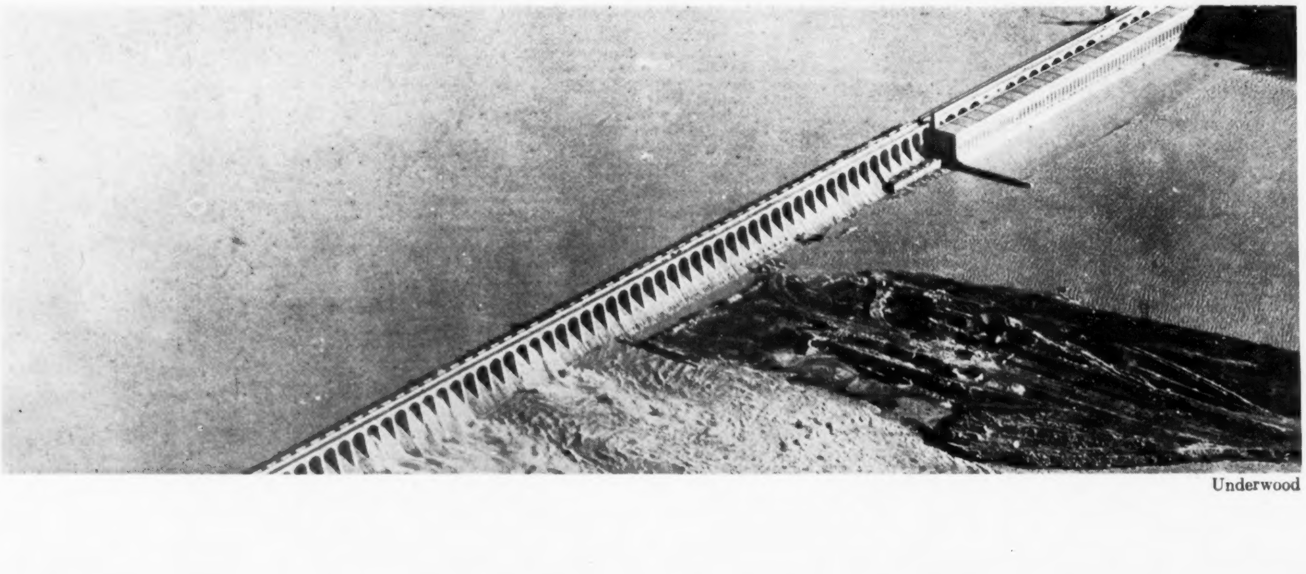
U. S. Bureau of Mines

The Bureau of Mines tests the efficiency of liquid air as an explosive

New York Coffee and Sugar Exchange breaks into a new field. C. H. Middendorf (left) is buying the first blackstrap molasses futures

Mirror

Below: New aerial view of Muscle Shoals. After being buffeted by ten years of debate in and out of Congress, the Muscle Shoals Bill sank to a temporary rest on President Hoover's veto, March 3rd

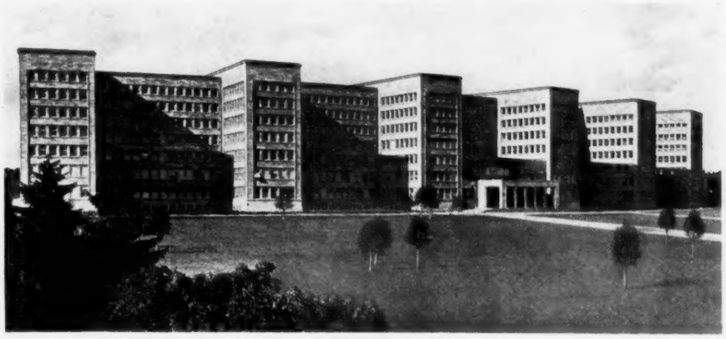


Underwood

NEWS REEL

of Chemical Activities

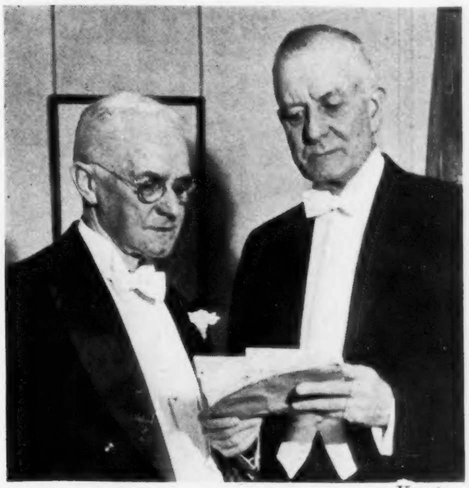
Industrial Chemistry abroad. New central office of the I. G. Farbenindustrie Aktiengesellschaft at Frankfurt-am-Main rivals our largest industrial office buildings



Harris Ewing

Above: Dexter North, temporary chairman of the Chemical Division of the Tariff Commission, is appointed permanent chairman

President L. V. Redman, and A. E. Marshall, Chairman of the Entertainment Committee, standing beside the memorial likeness of Morris Loeb, great and good founder of the present Chemists' Club. This picture was taken on the evening of the recent housewarming party



Keystone

George Eastman (left) listens to words of tribute on the occasion of the dinner given in his honor on his 76th birthday

Executives, employees and friends of the Philadelphia Quartz Co. gather to cut the one-hundredth birthday cake of the company


THE CALCO CHEMICAL
Calco
BOUND BROOK
CALCO
OIL OF MYRBANE

Group Prices

in Industrial Chemicals in 1930

Do you know which group of industrial chemicals declined the most? —the least? Chemical prices were affected in 1930 by several factors beside "Poor Business".

PRICE reductions in the coal-tar derivative group, recently announced, focus attention to the price stability of these products during 1930, and suggest a comparison with such other groups of industrial chemicals as alkalies, acids, metallic salts, and solvents. Such grouping does not provide representation for a large number of very important chemicals employed in large quantities, such as alums, bichromates, copperas, etc., but these five groups do account for the major portion of the total tonnage of industrial chemicals produced. In each of these divisions, four chemicals were rather arbitrarily selected; but they are thoroughly representative of each group.

For the alkalies, soda ash, chlorine, lime, and ammonia (anhydrous) were chosen. Developments within the short space of two years have forced the recognition of both lime and ammonia as important price factors in the alkali field. For the coal-tar derivatives, phenol, beta naphthol, phthalic anhydride, and salicylic acid were selected. In the other groups: metallic salts—copper sulfate, lead acetate, tin tetrachloride, and zinc oxide; solvents—acetone, ethyl acetate, alcohol (C. D. No. 5) and methanol; acids—acetic, sulfuric, formic and nitric are thoroughly representative. Purposely, a somewhat different selection of industrial chemicals was made than is used in determining the CHEMICAL MARKETS' Average Price, the object being to have one to check and to compare with the other. Of the chemicals listed below ten are also employed in the twenty representative chemicals in the Average Price. Those appearing in the Average Price and not listed in the five groups are, caustic soda, sodium bichromate, formaldehyde, carbon tetrachloride, lithopone, red lead, sodium nitrate, trisodium phosphate, and caustic potash: to a great extent chemicals with very stable prices.

The CHEMICAL MARKETS' Average Price showed a drop of 7.6 per cent in 1930. The average of all of the five special groups shows a decline of 13 per cent. The percentages of decline in price values in the five divisions are: 16 per cent for the alkalies, 4 per cent for the coal-tar derivatives, 8 per cent for the acids, 16 per cent for the solvents and 21 per cent for the metallic salts.

Thus it is seen that the severe drop in the metal markets has exerted a more profound effect on the industrial chemical price structure than has any action of the chemical industry itself. If the metal salt group is eliminated the average loss is but 11 per cent. It would be rather difficult to find any industry that

Declines in Industrial Chemicals

Group and Name													*Decrease*
Alkalies	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	%
Soda Ash, c/l.....bags	1.34½	1.34½	1.34½	1.34½	1.34½	1.34½	1.34½	1.34½	1.34½	1.34½	1.34½	.90	—34
Chlorine, Tanks.......	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.40	2.40	2.40	2.00	1.75	—30
Lime, Bags, c/l........	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	0
Ammonia, Cyl.........	.15½	.15½	.15½	.15½	.15½	.15½	.15½	.15½	.15½	.15½	.15½	.15½	0
													—16
Coal-tar Derivatives													
Phenol..............lb.	.14¾	.14¾	.14¾	.14¾	.14¾	.14¾	.14¾	.14¾	.14¾	.14¾	.14¾	.14¾	0
Beta Naphthol.......lb.	.22	.22	.22	.22	.22	.22	.22	.22	.22	.22	.22	.22	0
Phthalic Anhydride..lb.	.18	.18	.18	.16	.16	.16	.16	.16	.16	.15	.15	.15	—17
Salicylic Acid........lb.	.33	.33	.33	.33	.33	.33	.33	.33	.33	.33	.33	.33	0
													— 4
Metallic Salts													
Copper Sulfate, c/l..bbls.	5.50	5.50	5.00	5.00	4.75	4.75	4.25	4.25	4.10	3.95	4.25	4.10	—25
Lead Acetate, c/l...bags	13.00	13.00	13.00	13.00	13.00	13.00	13.00	12.50	12.50	12.50	10.50	10.50	—19
Tin tetrachloride.....lb.	.27¼	.25¾	.25¾	.25¼	.25¼	.25¼	.24¼	.20¾	.20¾	.20¼	.19¼	.19¼	—29
Zinc Oxide, l-cl.......lb.	.07⅜	.07¾	.07⅜	.07⅜	.07⅜	.07⅜	.07⅜	.07⅜	.07⅜	.06½	.06½	.06½	—12
													—21
Solvents													
Acetone, Tanks......lb.	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.1	0
Ethyl Acetate, Tanks..lb.	.115	.115	.115	.115	.115	.11	.097	.09	.09	.088	.088	.015	—26
No. 5 Alcohol, Tanks.gal.	.50	.50	.50	.43	.42	.42	.40	.40	.37	.37	.37	.38	—26
Methanol, Tanks....gal.	.45	.45	.40½	.40½	.40½	.40½	.40½	.40½	.40½	.40½	.40	.47 0	—11
													—16
Acids													
Acetic, c/l.........bbls.	3.88	3.88	3.88	3.88	3.88	3.34	3.11	3.11	3.11	2.70	2.60	2.60	—33
Sulfuric, lcl Car.........	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	0
Formic, drums.........	.10½	.10½	.10½	.10½	.10½	.10½	.10½	.10½	.10½	.10½	.10½	.10½	0
Nitric, Carboys.........	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	0
													— 8

has not experienced a more drastic reduction than 7.6—11.0 per cent.

Detailed study of the price changes in each of the five divisions discloses several interesting facts. In the alkalies, for example, the decline from the published quotation of $1.34½ for soda ash, carlots, bags, in January amounted to approximately 34 per cent when comparison is made with December figure of 90c. In a market such as prevailed among the alkalies during the last two weeks of December, it is very difficult to determine quotations, but the price of 90c is certainly representative of the market at that time. The second member of the group, chlorine, showed a decline of 30 per cent, the spread between $2.50 and $1.75. Both lime and ammonia were fairly stable and no appreciable changes were made in their price structures. It is plainly evident therefore that the unsettlement in alkali prices was directly due to the weakness of certain members and not to a broad general lowering of value of the group as a whole, although it is true that the most important members of the group from the consumption viewpoint did decline seriously.

Changes in Chemicals

Of the four chemicals comprising the acids, but one, acetic, was weaker. Sulfuric, formic, and nitric acids remained firm throughout the twelve-month period. The decline in acetic acid amounted to 33 per cent. Fundamental changes in the production of this acid had as much or more effect on the price structure than did the general decline in business.

Coal-tar derivatives had but one decline in the four chemicals, a drop of 17 per cent for phthalic anhydride. Here again conditions existing within the market for phthalic reasons for the loss and not the industrial situation generally.

In the solvents three of the four chosen for our group registered declines: ethyl acetate, 26 per cent; C. D. No. 5 alcohol, 26 per cent; methanol, 11 per cent; while acetone published prices were unaltered.

It is only in the metallic salts that we find losses in all four of the chemicals selected: copper sulfate, 25 per cent, lead acetate 19 per cent, tin tetrachloride 29 per cent, and zinc oxide 12 per cent. Here very definitely the reason for lower prices was the extreme weakness of the nonferrous metal markets. This is even more obvious when it is remembered that the decline in the metallic salts is less than for the corresponding metal.

Twenty Chemicals Show Decline

Of the twenty chemicals listed just one-half showed declines. It is illuminating to attempt to assign the chief cause for the loss in values. Soda ash, a sudden recurrence of highly competitive conditions brought about by production capacities in excess of even normal needs, further accentuated by a reduction in sales due to poor business conditions generally. Chlorine, overproduction and a lack of uses of sufficient tonnage to assimilate the increase in volume brought about by the swing to electrolytic manufacture of caustic. Phthalic anhydride, due to increased production and a resulting lowering of costs, also to a rather competitive situation between manufacturers in this item. Ethyl acetate suffered from the very noticeable decrease in the use of solvents for the lacquer and other industries employing solvents in large quantities and partly to the weakened state of the acetic acid market. Alcohol was affected by several conditions, among which might be mentioned lower blackstraped molasses values, poor business conditions curtailing industrial sales, warm winters cutting down antifreeze use; the introduction of high pressure synthetic methods of production. Methanol prices were, of course, lower due to the competitive position existing between the natural and synthetic and the accumulation of excessive stocks.

In the acids, acetic was likewise in a very keenly competitive position due to the strife between the synthetic and natural processes of production. In the metallic salts the decline has been explained rather fully previously in detail in the article, "Metal Statistics as an Aid in Buying Chemicals," appearing in the February issue of CHEMICAL MARKETS. With the non-ferrous metal markets reaching low figures for over a quarter of a century it is small wonder that this particular group showed the greatest decline. Even where tonnages were affected but slightly, as in the case of copper sulfate, the decline amounted to 25 per cent.

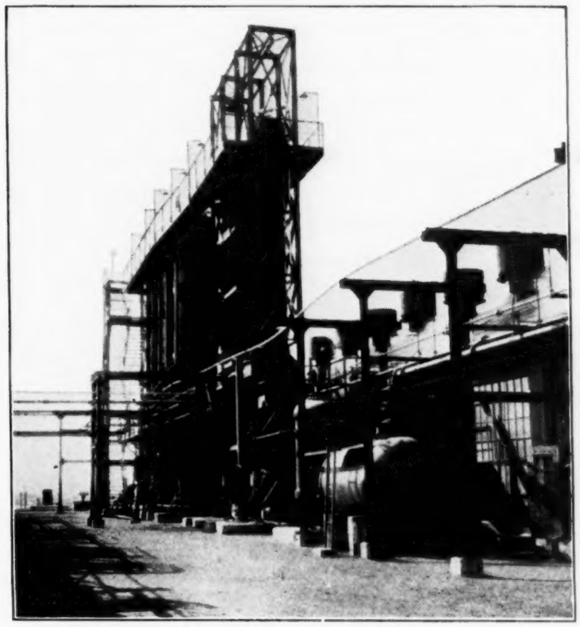
Effect of Changing Methods

Industrial chemical prices suffered, of course, from the restricted business activity of 1930. It is doubtful, however, if they were as much affected by the depression than they were by fundamental changes in methods of production, the warfare of synthetic versus natural, and it is probable that a large number of the reductions would have occurred even if the year 1930 had gone on to further heights of expansion. New products, new and cheaper methods of production of older chemicals are gradually forcing many prices to lower levels, a swing that is affected by temporary disturbances in the business horizon; but which proceeds quite regardless of the current ratios of production and consumption.

The General Asphalt Company and the Barber Asphalt Company, two American concerns, have won their action against the Anglo-Saxon Petroleum Company, Ltd. (the Royal Dutch-Shell group) from which the asphalt companies sought damages for alleged breach of agreement relating to the delivery of oil from the Vigas concession in Venezuela, worked by the Colon Development Company, in which the Anglo-Saxon company held a controlling interest.

Hydrogenation

An Expensive Toy or the Outstanding Development of a Decade?



Scrubbing tower cleansing gases of carbon dioxide at the Bayway, N. J. plant of the Standard Oil Co. of N. J.

HYDROGENATION has a mysterious sound and even to many of our chemical executives its economic future is a mystery. In fact, very few outside of the petroleum industry have a clear conception of what the process promises commercially, and it is decidedly not a cure-all for the petroleum industry. Like all other processes, it has its limitations.

Hydrogenation, as the name implies, is the addition of hydrogen atoms to the chemical structure of one organic compound to change it into another entirely different. Commercial hydrogenation has been practiced for many years, but has been strictly restricted to animal and vegetable fats and oils. Here the process has been of first importance: the well-known "Crisco," for example, being a hydrogenated cottonseed oil.

Limiting Factors of Process

The limiting factors of the hydrogenation process, previous to the recent work of the I. G. in Germany and the Standard Oil in this country, were as follows:

1. Normal pressure, or at most, two to three atmospheres above normal was used.

2. Only hydrogen of special purity, particularly free from sulfur and arsenic, could be used for fear of poisoning the catalyst.

3. Only temperatures could be used that were considerably below the point at which decomposition of the particular material to be hydrogenated took place.

As previously stated, because of these limiting factors, only vegetable fats and oils were eligible for treatment. Coal, shale and petroleum always contain sulfur. Accordingly the usual catalysts, such as finely divided and reduced nickel, were quickly poisoned and the process interrupted. The I. G. became interested in the problem primarily because Germany has a very limited source of fuel oils but is well supplied with coal and shale and to these they must turn eventually for fuel supplies.

Development of Process

The first research approach to the problem was to step up successively the pressures employed to one hundred atmospheres and to eliminate entirely the use of a catalyst. While this procedure did develop a rather high degree of liquefaction it also produced products difficult to refine further and the process was not a commercial success.

The I. G. chemists then proceeded to produce a group of catalysts which were not attacked by sulfur and these catalysts are, of course, the very heart of the new hydrogenation process. Their composition and preparation are often secret as well as being patented. These catalysts, of an alkaline nature, increase the rate of hydrogenation and prevent, through the elimination of oxygen, the formation of compounds which tend to increase the difficulty of further refining.

Further research on hydrogenation has been carried on in this country for a little over three years by the Standard Oil Development Co., a subsidiary of Standard Oil of New Jersey, and while attention has been given to the process from the primary viewpoint of the I. G., i.e. the conversion of coal and shale into gasoline, fuel, and lubricating oils, nevertheless, American engineers and chemists have approached the problem from a slightly different angle. Our natural resources are rich in crude oils of varying properties and at least for many years to come we shall not be dependent on coal, etc., for liquid fuels. Therefore in this country attention is focused on

modifications of the process that would permit hydrogenation of oils and oil wastes rather than coal.

The first experimental plant operated on a half barrel a day capacity, the trial runs being made at the Baton Rouge plant of a Standard subsidiary. Subsequently, a large scale plant was put in operation towards the close of last year at the Bayway plant of the Company.

How It Works

The actual operation of the process is along the following lines. Hydrogen may be obtained from several different sources. The water-gas process or the treatment of hydrocarbons with steam are, however, the most likely ones to be used. The material to be treated is subjected to the hydrogen, previously produced, at a pressure of about 3,000 pounds to the square inch and at high temperatures. The reaction actually takes place in the presence of the catalyst in a separate chamber from the one in which the intimate mixing is accomplished. The final result is controlled not only by the type of catalyst but also by pressure and temperature. The product then goes to a third chamber where the liquid is separated from the gases. The liquid is then restored to normal pressure, and the gases are scrubbed and returned to the circuit.

Dr. R. T. Haslam, Vice-president of the Standard Oil Development Co. and Dr. R. P. Russell of the Hydro Engineering & Chemical Co. outlined in the *Oil and Gas Journal*, in the *Industrial & Engineering Chemistry*, and M. W. Boyer, Director of Research for the Standard of Louisiana in his paper before the American Institute of Chemical Engineers last December reviewed the five applications of the present

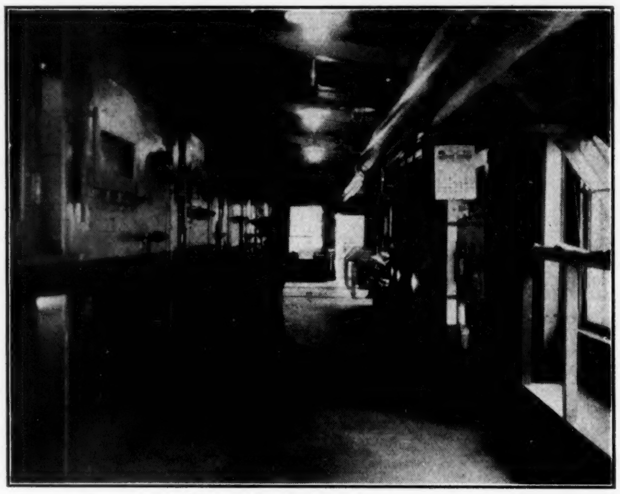
Aerial view of the new large-scale plant at Bayway, N. J.

hydrogenation process that promise the greatest commercial return, in this country as follows:

(1) The conversion of heavy, high-sulfur, asphaltic crude oils and refinery residues into gasoline and distillates low in sulfur and free from asphalt, without concurrent formation of coke.

(2) The alteration of low-grade lubricating distillates, to obtain high yields of lubricating oils of premium quality as to temperature-viscosity relationship, Conradson carbon, flash, and gravity.

(3) The conversion of off-color, inferior-burning oil distillates or light gas oils into high-gravity, low-sulfur, water-white burning oils of excellent burning



From this point the process is controlled. The operating panel at the Bayway plant

characteristics, with gasoline being the only other product except for a slight gas formation.

(4) The desulfurization and color- and gum-stabilization of high-sulfur, badly gumming cracked naphthas without marked alteration in distillation range and without major loss in anti-knock value. (It is possible to operate so as actually to enter the anti-knock quality.)

(5) The conversion of paraffinic gas oils into low-sulfur, gum- and color-stable, good anti-knock gasolines without the production of coke or heavy products.

In Other Words

Just what do the above mean translated into a little less technical language ? Just what, from the business angle, does this expensive, in fact, the most expensive piece of research work ever undertaken, hold forth in a commercial way ?

First of all, present refinery practices produce from the original charge a certain percentage of gasoline of greater value than the charge and a certain percentage of gas, coke and crude fuel oils none of which have a value equal to the charge. With the hydrogenation process the entire original charge can be converted into the lighter and lower boiling point products (gasoline). The apparent economies are very plain and unless the operating costs on a commercial scale are much higher than the sale price of these products the apparent economies are real ones.

Secondly, in the manufacture of lubricating oils the hydrogenation process produces oils that are superior to any now made by the present refining methods.

Thirdly, through hydrogenation, it is possible to take very poor grades of kerosene distillates, high in sulfur, of low gravity and to produce water white kerosenes of high burning quality. Commercially, this means that stock now considered unfit for use in the production of high grade kerosene can be used

Interior of pump house operating at tremendous pressures, requiring expensive equipment

successfully in competition with the better grades now necessary.

Fourthly, naphthas high in sulfur, gummy, and unstable can be treated to eliminate the detrimental characteristics. Again this means utilization of raw material formerly considered too poor to work.

Fifthly, because of the flexibility of the process products high in paraffine content may be produced and similarly from products of high paraffine analysis low-knock gasolines are possible. In other words the process is really reversible.

As is the case with most important discoveries the announcement of the hydrogenation process brought about a number of claims, some with substantial proof behind them and others based purely on imagination. Those who are really responsible for the work are proceeding with caution. The Sunday supplements are full of fiction.

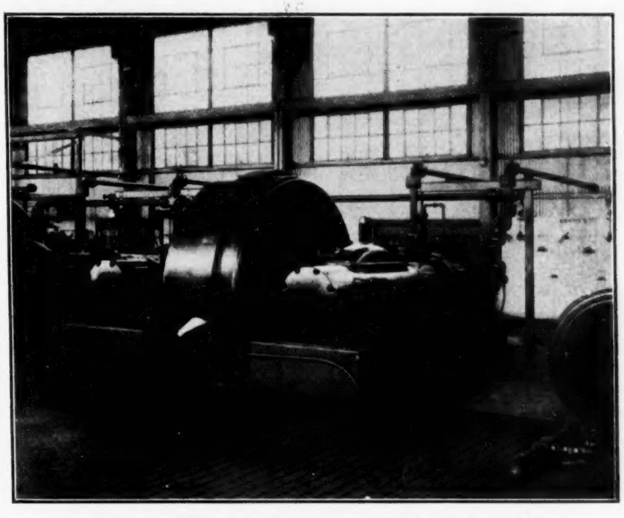
Not Yet Time-Tested

Without any attempt to disparage the process the following fact should be borne in mind—that large scale operations have yet to be started, or if operating, sufficient time has not elapsed fully to picture the situation commercially. The process requires compressed hydrogen which in itself is rather costly to produce. The erection, at least at the present time, of equipment for pressure work is very expensive and the oversupply of crude oil in this country will tend to retard the introduction of the process. Moreover, the process is a patented one and companies employing it will be compelled to pay a royalty.

It is thought that for the present the process will at most supplement present methods of manufacture in this country. It is a safeguard for the supply of petroleum products in the future. On the favorable side may be mentioned the facts, that generally speaking, poorer grades of raw material may be employed in the hydrogenation process than is possible with present refinery methods; that the final products produced are of special quality and as such would command higher prices; and finally that the flexibility of the process promises much in the way of operating economies.

Very little of the actual details of construction or operation have been disclosed. That the process is perfectly feasible from a chemical and engineering viewpoint may be taken for granted. However, what still remains to be proven is the commercial practicability in open competition with present processes and production costs. The results, both technical and commercial, obtained in the large scale operations at the Bayway, and the Baton Rouge, plants of the Standard and the Baytown refinery of the Humble Oil & Refinery Co. should clear up the commercial aspects of the process. Results obtained by the I. G. apparently prove of little value on this country. Commercially the situation in both countries is entirely different.

The next twelvemonth period should clear up many of the commercial questions involved. The hydrogenation process will prove either the most expensive toy we have yet produced or the outstanding commercial development of a decade in the field of chemical engineering. That the petroleum interests nationally and internationally are intently following the work goes without saying, for it is possible that a



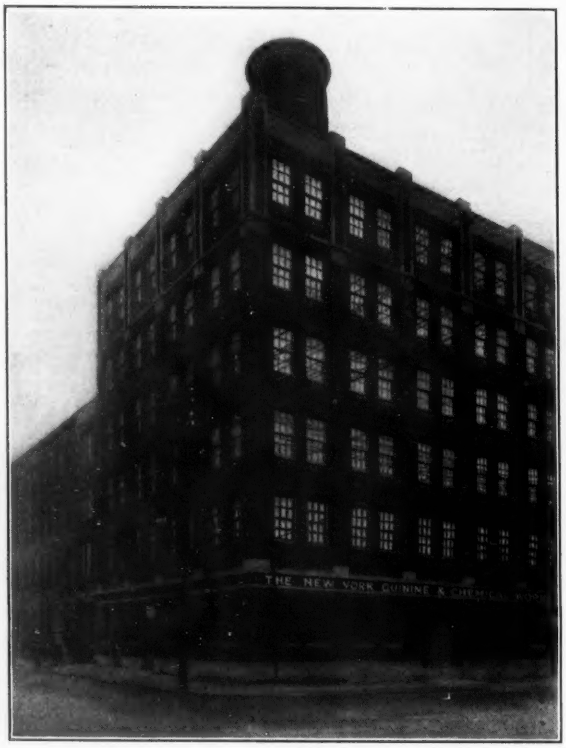
Booster compressor. After the gases are scrubbed free of carbon dioxide they are again compressed and returned to the circuit

complete revolution in methods is impending. As yet this is all to be proved, and it is significant that the petroleum refiners have not fallen over each other in haste to secure the license rights to hydrogenation which the Standard have freely offered.

A Half Century Manufacture Medicinal

Francis J. McDonough
President
since 1925 of New York Quinine & Chemical Works, Inc.

THE New York Quinine & Chemical Works, Inc., was established on a site which perhaps is the oldest in America continuously devoted to the manufacture of chemicals. In the then village of Williamsburg on Long Island, across the East River from New York, as the story is told, was a factory where during the Revolutionary War saltpeter and gunpowder were produced. Later on it was a soap factory. This was where in 1885 Daniel C. Robbins and his son Dr. Charles Robbins undertook the manufacture of quinine and the various salts from cinchona bark. The present New York Quinine traces its history back through half a century to the modest beginning of these pioneers in medicinal chemistry, and its location has been associated with chemistry for nearly two centuries.



The present enlarged plant erected in 1916 on the site of the original works.

Both Daniel C. Robbins, and his son, Charles Robbins, were partners in the drug and chemical house of McKesson and Robbins for several years previous to the building of the small plant in what is now the Borough of Brooklyn. Charles Robbins, determining to broaden his technical knowledge in preparation for future duties, had spent several years in Europe at the University of Berlin and at the University of Jena, receiving his degree of Ph. D. from the latter institution.

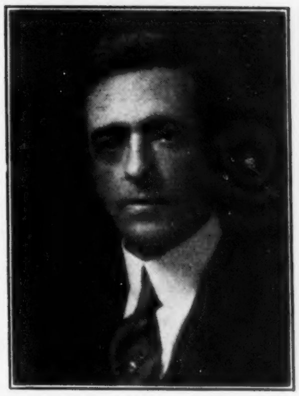
Great Interest Aroused Abroad

During the years of Dr. Robbins' sojourn abroad, great interest was aroused especially in Germany in the chemistry of the cinchona salts. Naturally, with the background formed by his early association with McKesson and Robbins, Dr. Robbins' attention was centered on this work. Returning to America, he brought a Dr. Polenski of the University of Berlin to the laboratories of McKesson and Robbins. Together with a chemist named McLaghan, the three succeeded in producing in a commercial way certain varieties of cinchona salts of special value to the medical profession.

These developments took place in the early '80s. The necessity for expansion and research in these products determined McKesson and Robbins, who already had so many diversified interests, to turn this one over to the Robbins family, although they realized how important and indispensable the quinine salts were to the medicinal chemical industry. Accordingly, Dr. Charles Robbins resigned from McKesson and Robbins. His father, while still maintaining an active interest in the firm, entered into a partnership with Charles and in 1885 started a

* One of a series of histories of 26 companies who have advertised in CHEMICAL MARKETS continuously for 10 years

Devoted to the of Fine and Chemicals*



Irving McKesson (left) vice-president and secretary, and Donald McKesson (right) treasurer of New York Quinine and Chemical Works, Inc.

separate organization at the Brooklyn factory under the name of Robbins & Robbins.

With the factory established and operating successfully, Dr. Robbins again visited Europe where he secured the services of a Mr. Alexander Bohringer of the factory of Bohringer Sons, Milan, and Dr. George L. Schaefer of the Milan Quinine factory. Bohringer became general manager and Schaefer production manager of the Brooklyn factory.

Discoveries in South America

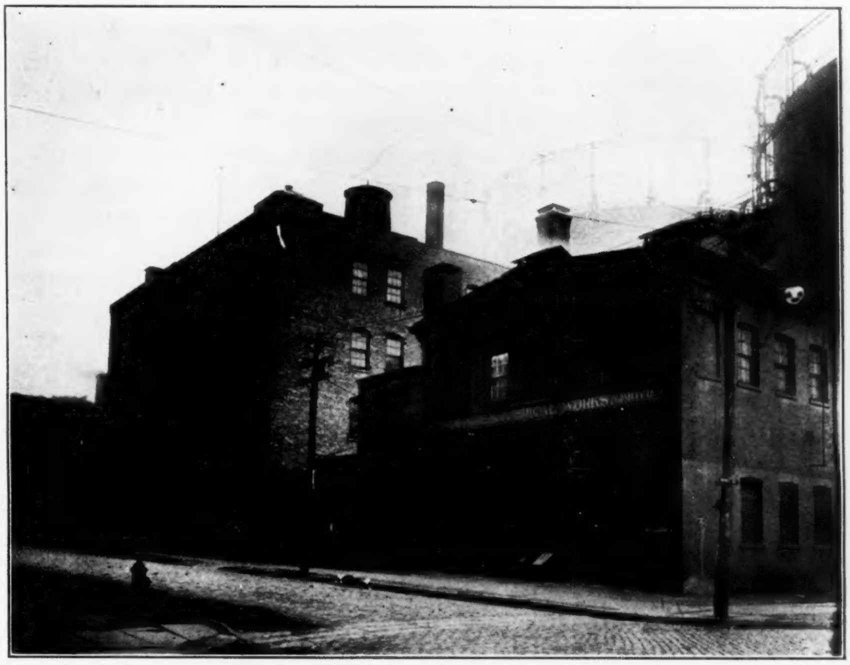
Dr. Robbins also visited South America to investigate at first hand conditions in the mountainous regions where the cinchona trees grew in a wild state. Several important discoveries in the first steps of the preparation of the bark were the result of nearly a year spent in the South American wild mountain regions. Dr. Robbins was considered by the medical profession as one of the greatest authorities in America on the chemistry of the cinchona salts. The contributions made by himself and his co-workers to the advancement of this branch of the medicinal chemical profession would require elaboration much greater than the scope of this article permits. Dr. Schaefer's outstanding ability was at once in evidence and under his direction the line was expanded considerably and the firm's position greatly strengthened.

In 1886 the business name of the enterprise was changed, and the new company incorporated as the New York Quinine & Chemical Works, Limited. At the same time, sales offices were opened at 35 Liberty Street, New York City. Several important changes in the personnel of the company occurred in the next few years. With the death of Alexander Bohringer, Henry W. Fuller, a brother of Chief Justice Fuller, and of the same family that founded the house of Fuller, Morrison & Co. in Chicago, took charge as general manager. In 1888 Daniel C. Robbins died, followed a year later by Dr. Charles Robbins, the leading spirit of the company.

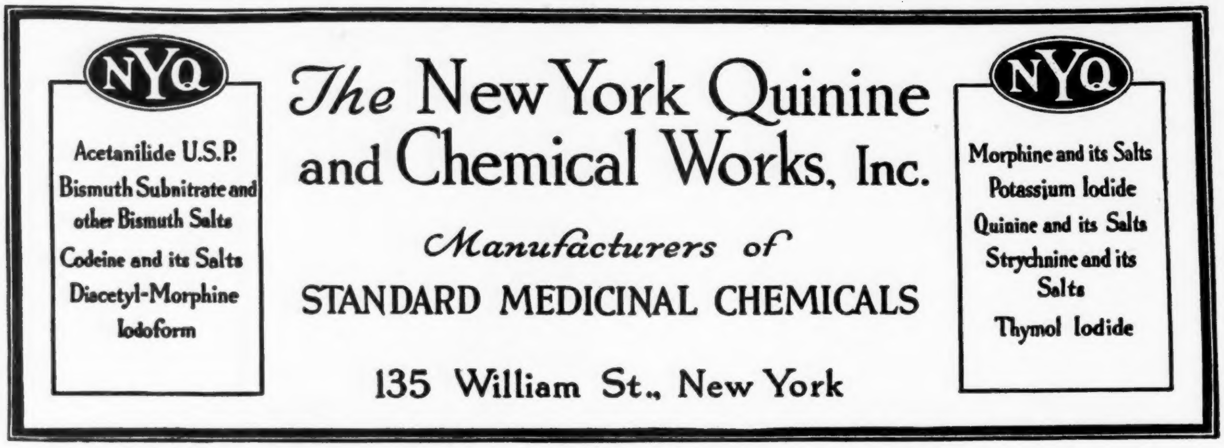
McKesson & Robbins Enter

To correct the rather unsettled condition of affairs caused by these untimely deaths, Herbert D. Robbins, a son of Daniel C. Robbins and a partner in McKesson & Robbins, suggested that his firm should take over the New York Quinine & Chemical. He became president of the latter concern in the season of 1889.

In 1894 Thomas P. Cook was engaged as sales manager of the New York Quinine and Chemical Works, Dr. Schaefer still remaining in charge of



The former plant of New York Quinine. The site is believed to be the oldest in America continuously devoted to the manufacture of chemicals



New York Quinine & Chemical Works, Inc., advertisement appearing in Drug & Chemical Markets ten years ago

production. Cook was one of the best known men in the chemical industry and the present Drug & Chemical Club of New York is one of his outstanding personal achievements. In company matters his success was such that the position of the company in the medicinal chemical field was greatly enlarged. His death in 1913 was a very serious loss. He was succeeded by T. R. L. Loud who continued as sales manager until 1922, when he died.

While the efforts of the firm of Robbins & Robbins, and later the New York Quinine & Chemical Works, in the first few years of existence were directed chiefly to the development of the cinchona salts, the company very early in its history adopted a progressive attitude towards research and the introduction of new medicinal chemicals. Very early the manufacture of morphine and other opium products was established. Additional plant was built from time to time for production of bismuth salts, iodides, strychnine and various glucosides. The New York Quinine & Chemical Works was the first in this country to produce acetanilid and synthetic menthol, the latter being identified to the discriminating by the trade-mark "Menthol-Y". While increases to the line were being made, the older products were not neglected, for the New York Quinine pioneered in the matter of purity and appearance of its products and added new salts and esters to the older standard preparations.

Begin Erection of Present Plant

In 1916 the incorporation was changed to a Delaware charter under the name of the New York Quinine & Chemical Works, Inc. but without any change of ownership or management. This year is likewise important as it marked the beginning of the erection of the present modern plant on the site of the original works.

After the death of John McKesson, Jr., which occurred in the latter part of 1925, his successors in McKesson & Robbins carried to a successful conclusion on February 3, 1925, a plan for separating the two companies. On this date the McKesson family interests assumed ownership and control of the New York Quinine & Chemical Works, Inc., a New York corporation, and all relationship with McKesson and Robbins was dissolved. With the organization of the new company, the sales offices were moved to the factory in Brooklyn. At the same time Francis J. McDonough became the new president after resigning his vice-presidency in McKesson and Robbins. Irving McKesson who had been treasurer of McKesson and Robbins became vice president and secretary.

The short period of independent operation has witnessed a tremendous growth and improvement in plant, sales and in the number of products produced. Because of the important medicinal character to many of the company's products, even greater emphasis than ever has been placed on the laboratories for research and control. Today these divisions are models of efficiency.

To readily appreciate the services of this company in the chemical growth of the country it is necessary to know that it was one of the two pioneers in the manufacture and gradual perfection of the cinchona salts, that for fifty years it has been supplying an exceptionally pure quinine and that under the leadership of such men as Dr. Schaefer it has gradually added to its line until today it serves the industry by producing a very complete line of fine and medicinal chemical compounds.

With a completely remodeled plant, equipment of the latest design, extensive research facilities, and a thoroughly progressive management, the future should hold even greater achievements than have been witnessed in the past fifty years. One of the very earliest chemical industries of Brooklyn, it has survived where others have failed. In an era highly competitive, the New York Quinine & Chemical Works stands firmly entrenched in a very prominent position in the medical chemical field. By the letters "N. Y. Q." New York Quinine is formally known all over the country.

The officers and directors of the company are: Francis J. McDonough, president, Irving McKesson, vice president and secretary; Donald McKesson, treasurer; and Hans Kellner, assistant treasurer.

Glycerine Production Doubles in the Last Decade

IN THE past ten years the United States has shaken off its dependence upon foreign sources of supply for the various grades of glycerine, so necessary to many of our important chemical and allied industries. Although during the decade consumption in this country has more than doubled, production has set even a faster pace. In 1920 domestic production amounted to only 67 per cent of our requirements of crude and 93 per cent of the refined. In 1930 domestic production of the crude took care of 94 per cent of our crude needs and 96 per cent of the refined.

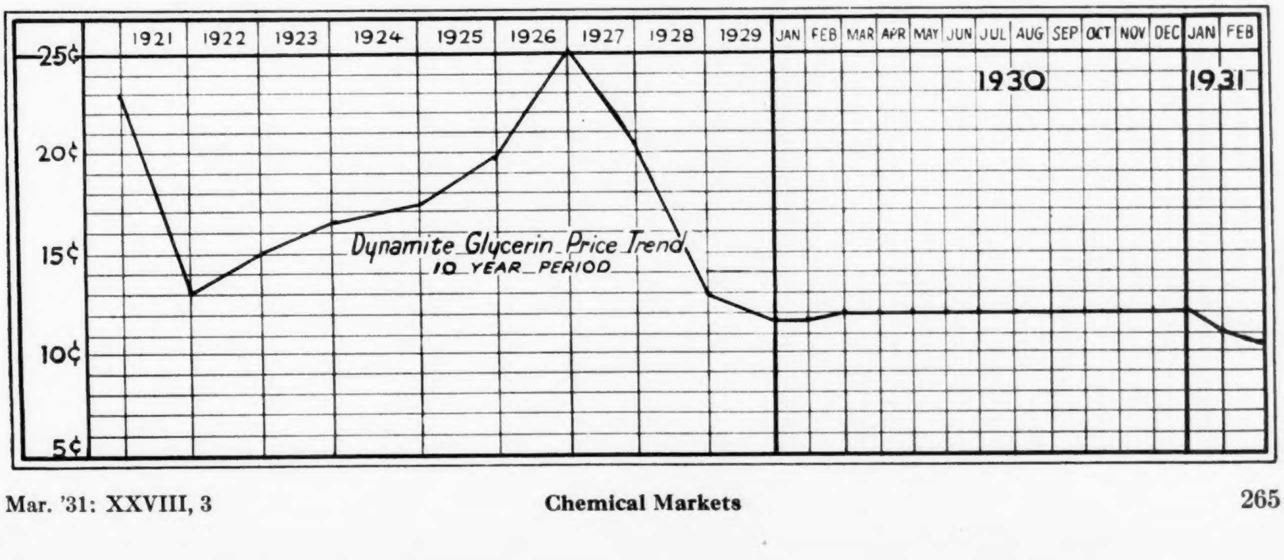
As consumption has increased the price has declined. In periods such as prevailed in 1926, when prices were forced up at a rather rapid rate, the rate of consumption was lowered, for the relationship between the price and consumption is specially sensative in the case of glycerine, since there are a number of optional uses depending upon cost.

The history of glycerine for the last ten years has been mainly the story of determined efforts by domestic producers to find new uses. Where previous to the war a large number of soap manufacturers were permitting the by-product glycerine to run down the sewer, the stimulus of war needs brought about the erection of glycerine recovery units in every factory of appreciable size. Accordingly the country was suddenly left with both an unwieldly surplus and a production capacity far exceeding immediate needs. With prices down to very low levels in 1921 several industries found that they could employ glycerine in their processes and soap manufacturers continued to run their units although there was considerable doubt in their minds as to the profitableness of such action. Being a by-product it is difficult to use any hard and fast rule in determining costs.

Despite the unpleasant outlook soap manufacturers, with the cooperation of equipment specialists, succeeded in effecting many notable improvements in recovery equipment, and for several years past our production costs have compared very favorably with those abroad. It is on this basis that we have been able to a large degree to eliminate foreign competition. Even at prices prevailing today, domestic producers are plainly finding it profitable to recover and refine, and obviously prices in effect now make our markets far less attractive to the foreign producer. Hence, we are now employing domestic glycerine, almost exclusively.

Development of Anti-freeze

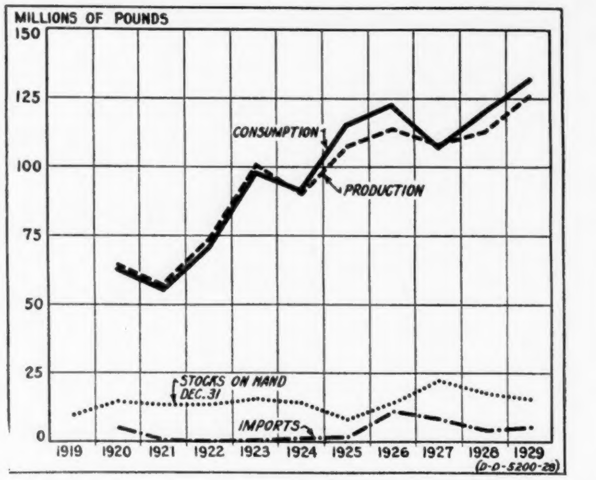
The search of the soap industry for a large outlet for refined glycerine led to the development of the anti-freeze properties of glycerine and each year sees some increase in the volume employed for this purpose. The producers have formed a trade association which



does co-operative advertising, and they have endeavored to present a united front in the keenly sought automobile trade. Nevertheless, this campaign has been a disappointment. First of all, glycerine received a setback from the early unfavorable results obtained by many car owners. Then ethylene glycol entered the market; and now synthetic methanol is threatening still further to divide available business. For some unexplained reason glycerine has not been able to enlist the hearty good-will of garagemen, and this sentiment has held sales down, where they should have increased.

Export Possibilities

The export field offers possibilities of new outlets; yet to date very little has been accomplished. In 1928 and 1929 with a production of close to 125,000,000 pounds each year, only two and a half million pounds were exported in the two year period. Our principal outlets are in our own hemisphere. Our imports in 1929 amounted to 14,601,736 pounds of crude and 5,493,471 pounds of refined. The figures for 1930 while not final indicate a very decided drop from 1929. In the first six months of last year only 4,566,513 pounds of crude came in and 933,450 pounds of refined. It is very evident that we are not as yet important factors in the international market. The United Kingdom, the Netherlands, France and Germany are dividing the export trade at present.



Consumption of production figures for refined glycerine

United States exports of glycerine

Destination	*1928* *Pounds*	*1928* *Value*	*1929* *Pounds*	*1929* *Value*	*First 6 months of 1930* *Pounds*	*First 6 months of 1930* *Value*
Mexico......	933,767	$108,198	368,944	$44,122	48,691	$6,481
Canada.....	765,898	88,918	229,177	40,424	44,272	6,159
Cuba.......	55,349	9,268	79,774	9,967	41,186	4,823
Chile........	9,648	1,815	465,215	64,190	9,661	1,396
Philippine Is..	33,658	6,179	33,464	5,263	7,180	1,279
Panama.....	6,920	1,288	11,585	2,356	7,012	1,736
Other.......	246,697	43,434	185,446	31,664	55,998	9,679
Total.....	2,051,937	$259,100	1,373,605	$197,986	214,000	$31,553

The following figures give in pounds the imports of glycerine into United States over a period of years:

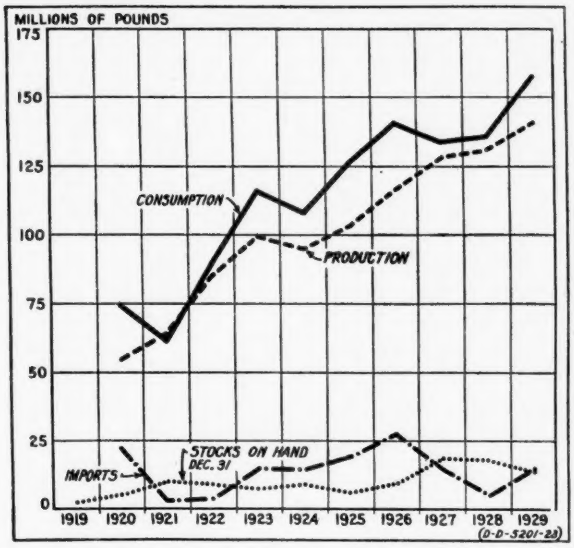
	Refined	*Crude*
1923....................	585,792	14,548,660
1924....................	1,500,644	14,427,054
1925....................	2,059,565	19,248,695
1926....................	10,732,246	27,701,142
1927....................	8,268,071	14,784,615
1928....................	4,287,587	4,501,727
1929....................	5,493,421	14,488,676
Jan.-July, 1930...........	1,153,945	5,530,235

Price Holds Stable

The price of glycerine has shown remarkable stability during the present period. From 1927 to the end of 1929 was one of rather rapid deflation from the high point of 26c to 11¾c (Dynamite grade). During the first part of 1930 the market rose slightly to 12c and remained at, or very close to this figure for the remainder of the year. January and February of this year saw reductions bringing the present level down to 10⅜c.

The trend as pictured on the accompanying chart indicates that glycerine prices were thoroughly deflated prior to 1930 and that production costs are close to sales prices at the moment. Any further changes will be slight. Should business fail to improve, or should it show further weakness, it is possible that further concessions might be forced upon

An example of the advertising of glycerine as an anti-freeze



Consumption of production figures for crude glycerine

producers. Contrarywise any marked improvement would unquestionably result in some slight advance. A definite check, however, is present against any marked rise. We are not utilizing to the full the glycerine production possibilities of soap manufacturers. Any important increase in price would bring additional supplies to the market, not to mention a very probable increase in imports. It is of special significance to note the relationship between the price and the volume of our imports. The years, 1925, 1926, and 1927, when prices were unduly high, saw also the years of our largest imports. As the peak price of 26c in 1927 started to drop to lower and less attractive levels foreign producers shipped less materials into our markets. At the present moment there is a rather delicate balance existing and the pendulum will not move very far in either direction.

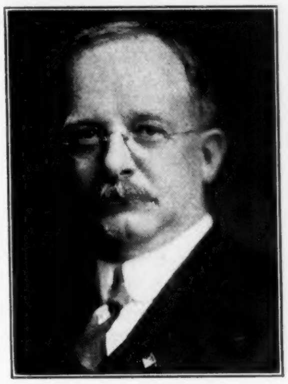
Associations

Association activity during February was principally directed towards perfecting plans for future events. In the vicinity of New York considerable interest manifested itself in the dinner March 12th of the Drug and Chemical Section of the N. Y. Board of Trade. The event promises to bring together the largest gathering that has ever attended the affair in previous years. The news of the election of Dr. Charles L. Reese, director and now consulting chemist for duPont to the chairmanship of the reorganized Board of Directors of the American Chemical Society was received favorably in all quarters. Preparations for the Chemical Exposition continue to occupy the time of several of the Societies as well as the companies planning exhibits. The Chemists' Club nominating committee has reported on a slate for the ensuing year and the Drug and Chemical Club elected several directors to its board.

Society of Chemical Industry held its meeting on February 20, 1931, in the dining room of the Chemists' Club. Members of the American Chemical Society, American Electrochemical Society and Societe de Chimie Industrielle were in attendance. The evening was devoted to a discussion of Plastics. The following paper was presented, "Designing Plastics with Specified Rheological Properties," by Eugene C. Bingham. This was followed by three 10-minute talks as follows: "Phenol-Formaldehyde Plastics"—C. A. Nash. "Urea Plastics"—George Barsky. "Casein Plastics"—W. E. Vawter.

Parsons Appointed Business Manager

Dr. Charles L. Parsons of Washington, consulting chemist, has been appointed business manager of the American Chemical Society. Dr. Parsons is the first incumbent of this post, created by the Board of Directors as a development of the Society's reorganization policy. Dr. Parsons has been secretary of the Society since 1907. He was born in New Marlboro, Mass., March 23, 1867, and was graduated from Cornell in 1888 as a bachelor of science. He received the degree of doctor of science from the University of Maine in 1911 and the degree of doctor of chemistry from the University of Pittsburgh in 1914. He was professor of chemistry in New Hampshire College from 1890 to 1911, and thereafter until 1919 was chief chemist of the U. S. Bureau of Mines. Dr. Parsons was awarded the William H. Nichols Medal of the New York Section of the Society in 1904 for research on the atomic weight of beryllium.



Charles L. Parsons

As business manager of the American Chemical Society, which he has been largely instrumental in building up, Dr. Parsons will administer the centralized business affairs of the largest professional organization of its kind in the world. The membership of the Society is now approximately 18,000, and its budget for 1931 about $600,000.

Elected President of Alcohol Institute

S. S. Neuman, President of Publicker Commercial Alcohol Company has been selected President of The Industrial Alcohol Institute, Inc., at the recent Annual Meeting. He is one of the youngest of the major executives comprising that body. Born in Baltimore, in 1899, Mr. Neuman attended grammar school and high school in Philadelphia, finishing his education at Temple College with the further distinction of completing a business course at that institution in one-third of the regular time.

S. S. Neuman

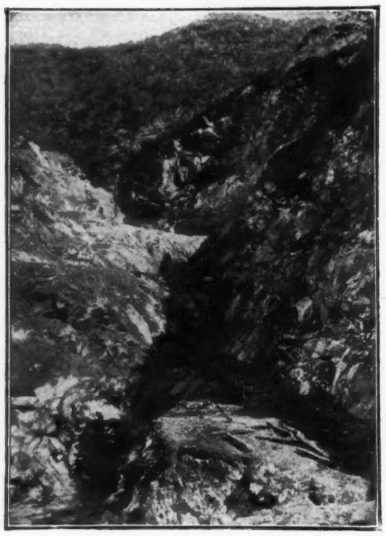
Mr. Neuman became associated with the Publicker Commercial Alcohol Company, of Philadelphia, in 1923. Today, only eight years after his joining that Company, Neuman occupies the chair of the President. The Publicker Commercial Alcohol Company is the largest independent producer of Alcohol, controlling its own molasses supply and a fleet of nine tank steamers.

Concurrent with the trend of the times, Publicker Commercial under the guidance of Neuman has not restricted its operations to the alcohol field alone. In recent years it has built up a modern chemical plant for the manufacture of solvents and pyroxylin solutions. They are also manufacturers of carbon dioxide ice and liquid carbon dioxide, through another Company sponsored and organized by Neuman.

Drug and Chemical Club (N. Y.) elected the following Directors at the annual meeting held on February 19. For term expiring January 31st, 1934, John S. Turn, re-elected; William Williams, re-elected; W. O. Badger, re-elected; A. A. Wasserscheid, A. R. Phillips. To fill vacancy for term ending January 31st, 1933, Joseph A. Huisking.

CHROME

Demand for chromium plating reaches out into South Pacific, changing economic conditions in a former French penal colony.



Chrome ore mines in New Caledonia are in a very mountainous region

FROM the chrome ore mine in New Caledonia to the chromium plated automobiles moving in dense traffic lanes along Fifth Avenue is indeed a long journey. In miles, the air-line distance is over ten thousand, and but for the Panama Canal the mileage would be in excess of sixteen thousand.

But then too, it is a far cry from the public square of Lancaster, Pennsylvania, in 1827, when Isaac Tyson discovered while chocking a cider barrel more securely to his cart that the stone he had so carelessly picked up was a piece of high grade chromite ore. For several years Tyson exported to England the ore which he gathered from the surface of his Maryland and Pennsylvania mines. In 1845 he established the bichromate industry in the United States, constructing his factory near Baltimore. An interesting side-light on this infant industry is the fact that Tyson was the first industrialist in this country definitely known to have engaged a chemist for control and research work.

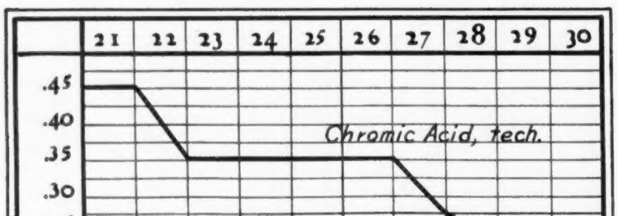
The chromite fields in the vicinity of Lancaster for many years supplied the requirements of the rather limited demand for bichromate of potash, but finally the need for further sources of supply became imperative.

If one examines rather closely a fair-sized map of that section of the world commonly referred to as "Down Under", a small island, equi-distant from Australia and New Zealand—New Caledonia—will be found. Originally a French penal colony, it has become famous as the source of the finest quality of chrome ore. The island has no monopoly of supply. Extensive deposits are now exploited in Rhodesia and India, and in the past few years the tonnage from the former has become greater than that originating in New Caledonia. Other parts of the world have chrome deposits but of poorer grade. No doubt at some time in the future, the Philippine Islands, Western United States and Canada will supply most of the ore for our needs. It will be necessary, however, to concentrate at the mine any such ore now known to exist.

New Caledonian and Rhodesian ores analyze a minimum of 48% while the others vary between twenty and thirty per cent. The world's reserves of chromite ore have been estimated at 5,000,000 tons, but this figure is constantly subjected to revisions as new veins are discovered or old ones thought to be near depletion give evidence of further commercial possibilities.

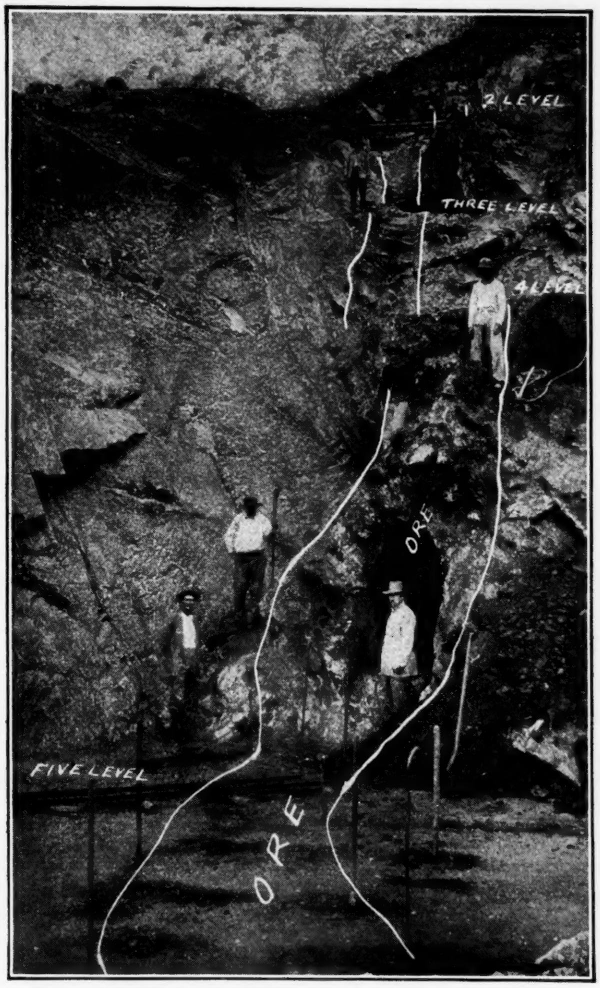
During the war period, due to the scarcity of shipping, Canadian fields were utilized. However, New Caledonian ore is still acknowledged leader in purity and physical adaptability and it is reasonably certain that the attractive chromium plated percolator at the breakfast table this morning had its chrome origin in the mountain fastness of that island.

The intimate story of the struggle to make a suitable chromium



Photos used through courtesy of Mutual Chemical Co. of America

Another view of the chrome mining region of New Caledonia



Close-up view of chrome mine showing occurrence of ore at different levels

compound for plating involves the American chemist at home and the American mining engineer abroad. To the mining engineer the struggle was especially difficult and disheartening because of the primitive state of the island, climatic conditions, the scarcity of satisfactory labor and the distance to the point of consumption.

The chrome deposits occur in irregular veins high in the mountainous region a considerable distance from the sea-coast. A few of the larger mines have been named, like the Tarbargi, one of the most famous. Only a highly trained mining engineer can trace the veins in their erratic wandering through the mountain ranges.

After the ore has been mined by means similar to those employed in the anthracite coal industry, it is brought to the entrance of the mine in narrow gauge cars. As roads are limited to the vicinity of the few coastal towns, the ore is transferred to aerial tramways and conveyed many miles by this means to the sea level. Again it is transferred to small gondola cars and transported either to the loading platform, if a vessel is at hand, or to the storage yards.

The harbors are too shallow for ocean-going vessels to dock at the quays for loading and every pound of ore is lightered to the ship's side. Chrome ore is usually carried in vessels specially chartered for this purpose.

Labor presents a difficult problem. The native New Caledonian is more interested in head hunting and similar primitive pastimes than in helping supply raw material for the plating industry. Accordingly, after repeated failures with the natives, indented labor has been imported from Java and China. To-day they are almost exclusively employed.

Production of Bichromates

Bichromates present an almost unique problem in the heavy chemical field. The ore entering into manufacture to-day was mined weeks ago. The average lapsed time for the journey from New Caledonia to this country is at least two months. To insure uninterrupted production, available ore stocks must be of tremendous proportions. This means a heavy dollars investment by the bichromate producer.

The first step in the manufacture of chromic acid is the conversion of chrome ore to bichromate of soda. Of course, the bichromate of soda itself has many uses and large tonnages are consumed so that the preparation of this commodity is not simply incidental to the preparation of the acid.

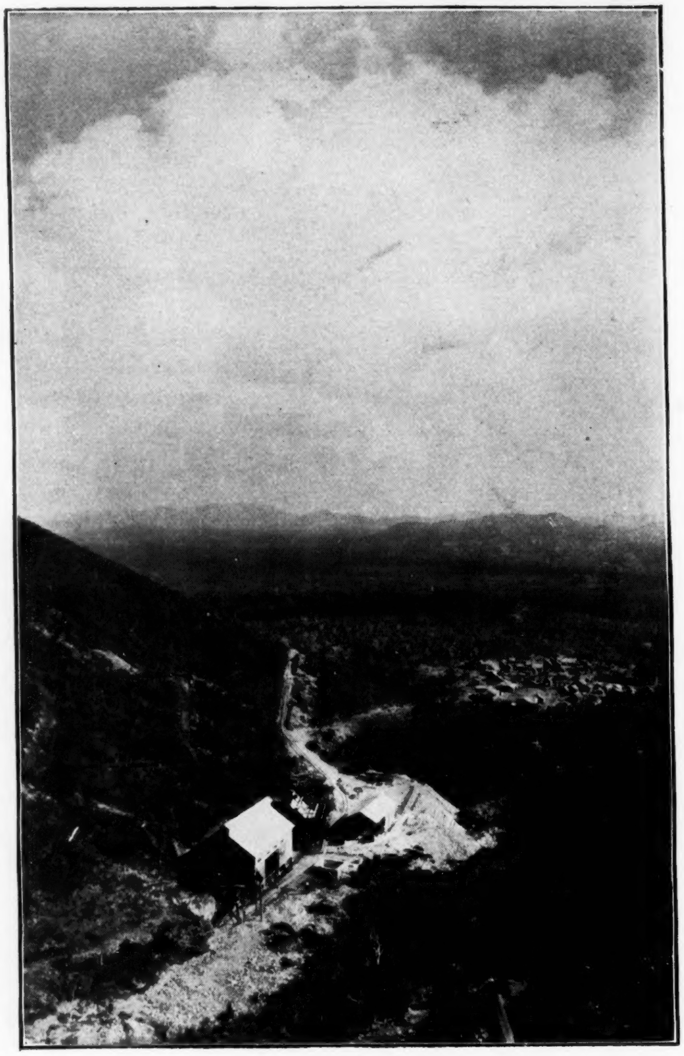
The ore is roasted in large furnaces together with soda ash and lime, the latter being added to prevent the resultant molten mass from becoming too liquid for satisfactory manipulation. While the chemistry involved is relatively simple the engineering problems are difficult. The sodium chromate produced is then oxidized to the bichromate by sulfuric acid.

In Cleaning Glassware

Every student of general chemistry soon learns that the most satisfactory method of cleaning chemical glassware is the addition of sulfuric acid to bichromate of soda. Rapid and powerful oxidation is, of course, the reason. The next step in the manufacture of chromic acid is simply this elementary reaction on a plant scale. The real problem is again one of chemical engineering, to turn out a large tonnage of acid of highest purity in an acceptable physical form. The article of commerce to-day is guaranteed 99½% CrO_3 minimum and consistently analyzes 99¾%. The sulfate content is maintained at .02% as a maximum and manufacturers have been doing even better than this figure for some time. However, these are the minimum requirements of such large consumers as General Motors and Ford. After the acid is dehydrated it is either ground to remove large undesirable lumps so it may be more easily soluble, or else prepared in the flake form. Considerable research has been made by several producers of chromic acid in an effort to manufacture the acid directly from chrome ore, but little progress has as yet resulted.

In relatively few years of commercial application, chromic acid plating has made tremendous advances and yet is in its infancy. From the novelty of chrome

plated radiator shells on the Oldsmobile of 1925 we now have almost universal adoption by automobile and automobile accessory manufacturers —the real estate agent in his sales talk stresses chromium-plated bathroom fixtures—jewelry of the cheaper grades is chromium-plated—the cracking stills in our larger refineries are given the protection of an especially heavy chrome plate—the adaptations are too numerous to mention. The place of chromium-plating is definitely assured. Its hardness, durability, resistance to corrosion, combined with its beauty, fills a long known need in the plating field.



Bird's-eye view of chrome ore mining village in New Caledonia

New Problems Introduced

The introduction of chromium has brought many new problems to the plater, those of a technical nature directly bearing upon the successful finish and those relating to health. Bichromate manufacturers have known for years how to prevent the ill-effects of chromium poisoning and with the introduction of scientifically designed equipment for the disposing of fumes in the plating room this danger has been eliminated.

Because of the stress of competition, the introduction of chromium plating was in the beginning hastened unduly in numerous instances with the result that poor work was inevitable. For successful operation the plater soon discovered that the old rule of thumb method must be abandoned and greater control exercised than needed for satisfactory results with nickel. As soon as these factors were determined the appearance and wearing qualities of chromium plate fully justified the claims that had been made for it.

The question of the final result of the competition of the so-called "stainless steel" is a natural one and the final answer cannot be given at this time. In all probability both will find satisfactory places and will cease to be competitive. Ford, pioneer in so many things, has solved many of the engineering difficulties that were presented in the commercial adoption of stainless steel to many parts of the new Model A. Yet his company's consumption of chromic acid continues to increase tremendously. The greater portion is employed in the so-called "hard plate" on gauges and other precision instruments. In one Ford department six hundred and forty gauges a day were formerly discarded. Now they are salvaged and given greater length of service through chrome-plating directly on steel. The manufacturer of such articles as percolators, toasters, etc., will perhaps always employ chrome plating.

Complications from Price Decline

The rather sharp decline in the price of chromic acid due partially to improved manufacturing methods and increased production and partially to the sharp competition that has existed between the producers to date will render still more difficult the path of the manufacturer of stainless steel, although it is acknowledged that labor charges form a major portion of expense in chrome plating. As to what effect the expiration of the existing stainless steel patents will have it is difficult now to say.

Foreign Competition

Some foreign competition exists in chromic acid. Chromic acid of German manufacture has been used in this country and under the previous tariff was on the free list. Under the new one it carries a duty of 25% ad valorem.

New York section of the American Association of Textile Chemists and Colorists held the February meeting at the Building Trades Employers' Association, 2 Park avenue, on February 27.

The meeting consisted of a symposium on colloid chemistry. As the importance of colloid chemistry is becoming more generally realized, a large turnout was present to take advantage of the papers read by two authorities on the subject.

The papers presented were "The Importance of Absorption and Other Colloidal Phenomena in Plant Operations," by Dr. Pierce M. Travis, and "Practical Dyeing and Printing as Influenced by Colloid Chemistry," by Dr. E. W. Pierce.

Creoste as a Wood Preserving Agent

S. R. Church, member of the executive committee of the American Wood Preservers Association, challenges M. D. Curwen's recent statement in CHEMICAL MARKETS that "Wood preserving on the whole is decreasing".

In the February issue of CHEMICAL MARKETS, M. D. Curwen, Editor of the Industrial Chemist (London) in his review of the British Chemical industry stated that:

"Coal tar exports are down again, the main offenders being tar and creosote oils. Wood preserving on the whole is decreasing, railway sleepers of wood, for example, being increasingly replaced by metal sleepers. If the new method of wood impregnation with synthetic resin worked out at the University College of London University and now being described in this journal, is successful, the creosote industry will suffer still further."

S. R. Church, a member of the executive committee of the American Wood Preservers Association has taken exception to Mr. Curwen's remarks as they affect the creosote industry in America in the following communication to the Editor of CHEMICAL MARKETS:

"Since a very large proportion of the creosote exported by Great Britain has for many years come to this country, it may be instructive to point out that the decrease in our imports of creosote from England and the Continent, a decrease of about ten million gallons in 1929 from 1928 and probably somewhat larger decrease in 1930 over 1929, was not due to a general falling off in wood preserving but rather to the large increase in production of creosote in the United States.

"The statistics issued by the U. S. Department of Agriculture in cooperation with the American Wood Preservers Association show that there has been a steady increase in the use of creosote each year since 1918, the 1929 consumption reaching a new record of 226 million gallons. Official figures for 1930 are not available, but the total will not be appreciably less than for 1929.

"Metal railway sleepers are not used in the United States, although they have been tried here. They are being used quite extensively in Germany, not because they are preferred by the railway administration, but because the steel interests are powerful enough to compel the use of a certain proportion of metal sleepers. They are also used to some extent in South American countries, where treated wood is not yet available.

"The wood preserving industry, although it is probably suffering to some extent in common with all industries in the present depression, is due for further expansion not only in this country but in the world, as the economies of treated wood become better known to engineers and architects with consequent diversification of its uses."

Because of this difference of opinion it is of interest and importance to quote from a report on the creosote importations by A. H. Swift, Chemical Division, Department of Commerce (Commerce Reports for February 16, 1931) and also an earlier report by J. N. Taylor and R. G. Boyd of the same Department on the creosote industry in the United States.

Creosote oil.—Creosote oil was next in importance, (fourth in list of chemical imports by value) with $7,806,000 (66,922,000 gallons), notwithstanding rather marked declines since 1927 when $15,384,000 worth (95,915,000 gallons) entered the country. From 1921, when only $4,240,000 worth (41,568,000 gallons) were imported, until 1927 imports were upward, but, following greater production within the country to take care of the increased demand, they again started downward.

As a result of large installations for the recovery of "dead" (creosote) oil from tar that formerly would have been consumed as a fuel, there was a 25 per cent quantity advance in the United States 1929 production (167,685,000 gallons, valued at $19,317,000), according to data released by the United States Tariff Commission. The 11 per cent increase in the 1929 consumption of approximately 246,000,000 gallons was largely in consequence of the wider employment of creosote preservatives in treating lumber, as evidenced by the 226,374,000 gallons used in 1929 contrasted with 220,478,000 gallons in 1928 (calculated by the United States Forest Service). The increase in the amount of creosote used in treating lumber in 1929, however, is actually larger than is indicated by the foregoing figures (for creosote preservatives) since the percentage creosote composition of the 1929 total is larger than the 1928 figure. The use of creosote "coal-tar solutions" for this purpose dropped from 87,212,000 gallons in 1928 to 74,828,000 in 1929, whereas there was an increase in the employment of "distillate coal-tar creosote" from 48,805,000 gallons in 1928 to 57,914,000 in 1929.

Fats and Oils In The Last Quarter of 1930

Cottonseed Oil Again Leads in Production Volume with Lard Next in Order. Production in Excess of Consumption Builds Up Large Inventories.

Factory production of fats and oils (exclusive of refined oil and derivatives) during the three-month period ended December 31, 1930, was as follows: vegetable oils, 1,003,813,580 pounds; fish oils, 27,814,528 pounds; animal fats, 515,598,363 pounds; and greases, 88,509,932 pounds; a total of 1,635,736,403 pounds. Of the several kinds of fats and oils covered by this inquiry, the greatest production, 725,462,965 pounds appears for cottonseed oil. Next in order is lard with 388,936,388 pounds; linseed oil with 131,256,804 pounds; tallow with 125,337,778 pounds; coconut oil with 90,921,026 pounds, and corn oil with 26,166,566 pounds.

The production of refined oils during the period was as follows: Cottonseed, 636,407,386 pounds; coconut, 77,611,919 pounds; peanut, 2,001,988 pounds; corn, 25,481,770 pounds; soya bean, 2,367,591 pounds; and palm-kernel, 4,398,658 pounds. The quantity of crude oil used in the production of each of these refined oils is included in the figures of crude consumed.

The data for the factory production, factory consumption, imports, exports and factory and warehouse stocks of fats and oils and for the raw materials used in the production of vegetable oils for the three-month period appear in the following statements:

Raw Materials Used in the Manufacture of Vegetable Oils

KIND	Tons of 2,000 pounds	
	Consumed Oct. 1 to Dec. 31	On hand Dec. 31
Cottonseed	2,407,807	991,341
Peanuts, hulled	5,844	1,733
Peanuts, in the hull	2,176	1,017
Copra	71,134	41,077
Coconuts and skins	543	88
Corn germs	41,211	258
Flaxseed	206,944	125,218
Castor beans	10,830	7,294
Mustard seed	151	1,478
Soya beans	21,251	33,401
Olives	2,788	90
Other kinds	9,642	4,383

PRODUCTION, CONSUMPTION, AND STOCKS OF FATS AND OILS

(In some cases, where products were made by a continuous process, the intermediate products were not reported.)

KIND	Factory operations for the quarter ended December 31, 1930		Factory and Warehouse stocks, December 31, 1930 (pounds)
	Production (pounds)	Consumption (pounds)	
VEGETABLE OILS: (1)			
Cottonseed, crude	725,462,965	692,025,173	114,248,422
Cottonseed, refined	636,407,386	331,745,892	428,609,270
Peanut, virgin and crude	4,923,869	2,510,737	7,888,443
Peanut, refined	2,001,988	2,498,178	1,857,630
Coconut, or copra, crude	90,921,026	159,545,086	164,205,940
Coconut, or copra, refined	77,611,919	79,710,666	22,352,232
Corn, crude	26,166,566	32,784,875	7,882,274
Corn, refined	25,481,770	5,632,544	8,881,799
Soya bean, crude	6,193,747	4,209,346	12,282,259
Soya bean, refined	2,367,591	2,074,918	2,665,678
Olive, edible	679,075	508,391	8,354,428
Olive, inedible	9,500	1,487,502	1,779,873
Sulfur oil or olive foots	....	10,089,843	29,249,433
Palm-kernal, crude	332,126	15,350,678	15,234,364
Palm-kernal, refined	4,398,658	3,349,652	2,055,156
Rapeseed	....	2,697,526	5,370,682
Linseed	131,256,804	69,306,656	113,594,170
Chinese wood or tung	....	17,376,409	49,599,494
Chinese vegetable tallow	....	936,087	3,502,168
Castor	10,036,527	4,159,124	8,378,763
Palm	....	54,785,195	92,301,979
All other	7,831,375	7,857,698	7,129,245
FISH OILS: (1)			
Cod and cod-liver	356,729	3,791,861	10,611,506
Menhaden	3,516,096	4,154,070	11,350,516
Whale	5,789,438	16,476,641	57,070,796
Herring, including sardine	17,304,645	15,398,895	100,342,637
Sperm	392,805	325,291	4,327,364
All other, (including marine animal)	454,815	2,556,540	14,067,648

(1) The data of oils produced, consumed, and on hand by fish oil producers and fish canners were collected by the Bureau of Fisheries.

KIND	Production (pounds)	Consumption (pounds)	Stocks (pounds)
ANIMAL FATS:			
Lard, neutral	5,764,907	4,152,024	1,356,653
Lard, other edible	383,171,481	6,960,459	44,086,081
Tallow, edible	12,583,384	10,133,389	4,119,445
Tallow, inedible	112,754,394	132,386,105	140,954,169
Neat's-foot oil	1,324,197	1,132,034	1,424,297
GREASES:			
White	15,240,360	9,878,578	8,811,696
Yellow	19,654,235	9,082,599	11,530,686
Brown	11,447,491	13,735,613	12,888,589
Bone	5,991,197	26,730	2,916,595
Tankage	12,578,302	94,833	5,756,087
Garbage or house	18,521,706	13,599,811	25,538,475
Wool	1,987,224	1,002,965	3,372,941
Recovered	1,019,920	881,297	3,989,932
All other	2,069,497	1,173,901	2,406,234
OTHER PRODUCTS:			
Lard compounds and other lard substitutes	331,412,492	558,788	26,672,374
Hydrogenated oils	164,887,718	145,584,586	23,298,070
Stearin, vegetable	3,677,923	4,588,528	2,103,826
Stearin, animal, edible	13,457,907	10,741,527	3,101,088
Stearin, animal, inedible	3,233,501	3,965,453	7,286,991
Oleo oil	26,121,276	12,069,841	19,686,439
Lard oil	2,350,585	2,396,571	3,655,945
Tallow oil	1,269,223	1,950,188	1,711,206
Fatty acids	33,142,289n	31,266,091	10,975,043
Fatty acids, distilled	10,400,323	8,272,253	4,444,827
Red oil	7,422,586	5,337,245	5,788,752
Stearic acid	6,419,746	2,131,410	5,515,328
Glycerin, crude 80% basis	32,980,423	38,298,245	12,793,160
Glycerin, dynamite	13,460,752	7,148,175	9,160,185
Glycerin, chemically pure	19,550,975	2,030,697	6,829,504
Cottonseed foots, 50% basis	91,308,356	73,905,080	74,330,938
Cottonseed foots, distilled	20,525,277	18,708,002	7,318,099
Other vegetable oil foots	18,590,302	14,307,599	4,068,471
Other vegetable oil foots, distilled	296,890	608,497	337,269
Acidulated soap stock	22,497,062	10,914,301	27,032,579
Miscellaneous soap stock	417,130	958,052	1,528,717

Plant Management

A Department
Devoted to the Business Problems of Chemical-Process Production

Research Values

Chemical research, like all Gaul, may be divided into three divisions. Research to improve existing processes. Research to perfect new processes or find new products. Research to find new uses.

The first is by far the most common. Because it requires the least vision and promises the promptest return, it is most apt to be the major objective of most research programs. But research to improve existing processes is quite the least profitable form of chemical engineering investigation. Often indeed it is positively unprofitable even when the research itself is successful. For it is not difficult to set up figures that look something like this: cost of the research, $20,000; cost of the plant improvements, $40,000; saving effected, $5,000 a year, which on the basis of five-year amortization shows something better than a 100% mal-investment. This may be an extreme example, but is by no means a rare one.

Research for new products and new processes holds the big prize; but it also entails the big gamble. Except for those lucky chances, which are becoming less and less common, this type of work offers too little prospect of return to tempt the average corporation to make it the chief purpose of its research.

On the other hand, research for new uses offers almost a sure return with almost no element of risk. Yet curiously it is generally the most neglected form of investigation, and this too, in spite of the basic problem of over-production and the prospect that inter-product competition will strongly mark the chemical developments of the coming decade.

Careful study of the comparative values of these distinct types of research is needed today. And this is pre-eminently a problem of the technical staffs of the industry. Our executives have been sold research. It is the responsibility of the research directors to see to it that their workers devote their time and energies to solving problems that are economically sound. It is no time to effect operating economies that cost more than they save: it is high time to increase the market for the products that we are now manufacturing with reasonable efficiency.

Soft Rubber
in Chemical Process Equipment

By H. E. Fritz*

THE development of rubber for industrial purposes and for manufacturing equipment has been rapid during the past few years and broad in character. These changes have brought about new uses, increased service and greater economies. The range of physical properties, uses and costs of the many different grades of rubber is now probably as great as the variation in iron and steel, and their alloys.

Rubber has many constant and exclusive qualities, the service of which to date has not been duplicated. Utilization of these properties of rubber has always presented a difficult problem owing to certain limiting factors, such as the lack of rigidity, tensile strength, etc., but more recently engineers have overcome some of these and have opened many new fields of service. One of the outstanding developments is the so-called Vulcalock process, by which rubber is bonded to metal. This process has aided greatly in solving many of the baffling problems of abrasion and corrosion.

Vulcalock Process Defined

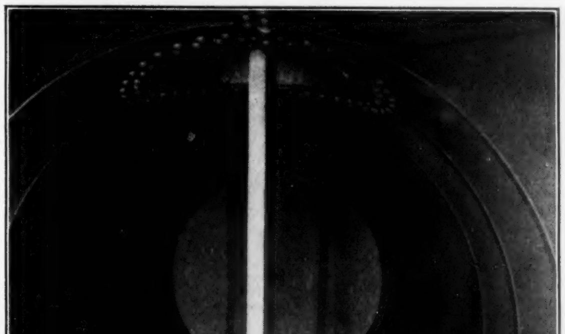
As a result of extensive research and wide experience a process has been discovered whereby soft rubber is applied directly on smooth iron or steel surfaces. Adhesion between the two materials is so complete that they appear to be integral, and the bond approaches the tensile strength of the rubber itself.

Adhesion tests have been made to show in excess of 700 lbs. tensile strength to the sq. in. The new process has been found successful in attaching rubber to other metals, such as brass and aluminum, also to wood and concrete.

The pliable, semi-plastic gum is applied to the cleaned metal surfaces and cured in place, and it is during the curing operation that the remarkable adhesion is set up. The only limiting factor of the Vulcalock attachment is heat, and at present its application cannot be conservatively recommended where the operating temperature exceeds 150° F.

There has been a long-felt need in industry for a corrosion-resisting construction material which, when subjected to general factory conditions, would be serviceable over an appreciable period, regardless of shock, strain and vibration, which are often present to a degree sufficient to eliminate the use of anything fragile in character. Such a material would greatly decrease replacement and maintenance cost, and might lead to a revival of manufacturing processes which are at present in the discard. The Vulcalock process has contributed largely to the development of such material.

Rubber is now effectively resistant, without contamination, to all the acids except nitric and highly concentrated sulfuric. Rubber will successfully resist the corrosion of 50 per cent sulfuric acid and 85 per cent phosphoric acid, and the common corrosives such as hydrochloric acid and hydrofluoric acid; salt solutions present no problem at all when stored and transported in rubber-lined containers.



Interior of rubber-lined tank car for transporting corrosives

*B. F. Goodrich Rubber Co.

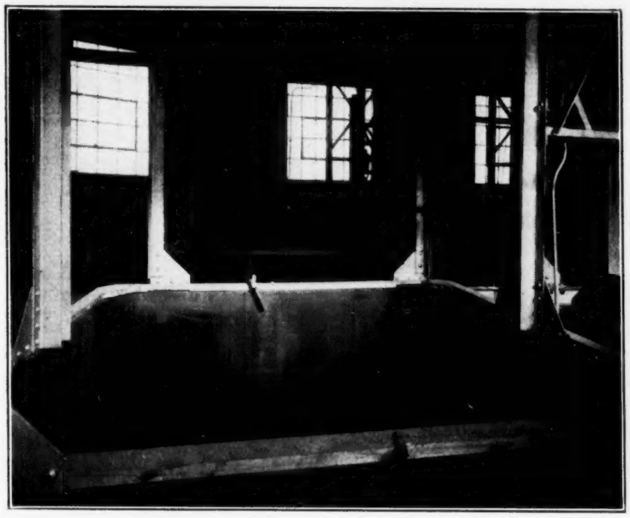
It is desirable to have a tank shell with a smooth, clean inside surface so that the rubber will conform to the metal surface and cure in place with uniform thickness, without any open joints, which would destroy the purpose of the lining.

The same process has been successfully used for the attachment of tubed or sheet rubber in standard steel pipe and fittings, including special valves. The rubber is so applied that all metal contact is eliminated, giving the pipe a three-fold utility, to resist abrasion, to resist corrosion and to conduct liquids which are subject to contamination from metal contact.

The lining of steel tanks, receptacles and tank cars with soft rubber is proving acceptable in the ceramic, chemical and allied industries, and rubber is taking the place of less corrosive-resisting and more fragile linings. Railroad tank cars have been lined by the Vulcalock process in sufficient numbers to have developed a standard method for the lining. Special equipment has been provided and special men have been trained in this class of work.

Abrasion Resistance

It has been known for some time that a good grade of rubber has a remarkable ability to resist abrasion and special study has been given to the compounding of rubber for various kinds of abrasion-resisting service. Rubber technologists have at last been successful in developing a grade of rubber which possesses remarkable abrasive-resisting properties and which, when properly applied, will many times outwear steel of the same thickness. For those who are not familiar with this quality of rubber, the remarkable resistance



Rubber-lined pickling tanks installed at a factory at Alliance, Ohio

to abrasion of the rubber tread of an automobile tire which frequently travels upwards of twenty thousand miles and successfully withstands severest abrasion and abuse may be cited as a convincing example. Everyone who has used skid chains knows that the hard alloy steel links, when exposed to bare brick or concrete, will wear to a point of failure in a few hundred miles while the tread of a good tire, absorbing abusive impact and friction, will show no appreciable signs of wear.

A large manufacturer of abrasives required a machine to mix finely abrasive material and bronze arms were used in the mixer to eliminate a certain

Fleet of rubber-lined tank cars transporting corrosive acids

undesirable contamination, which would have occurred if iron or steel arms had been used. These bronze wearing parts gave a life of only six weeks and were a source of trouble and expense. To test its effectiveness one of the arms was covered with ⅛-inch rubber. This thin coating has now been in service for ten months, and is reported to be still in excellent condition.

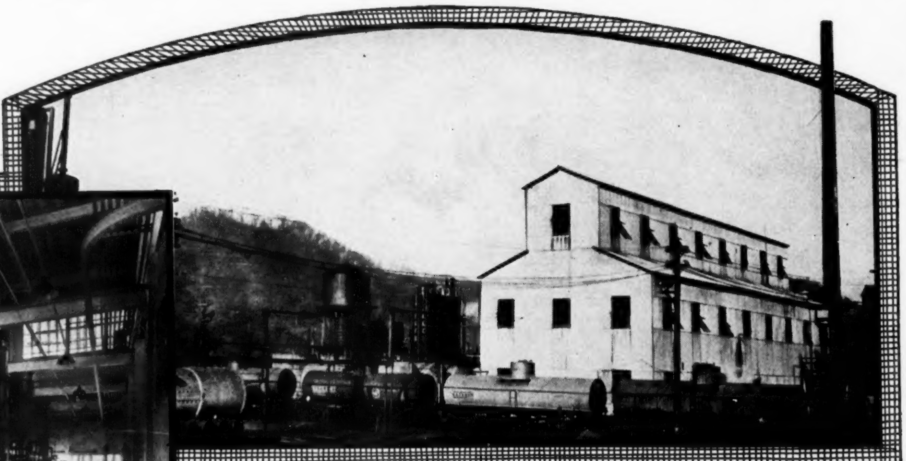
The operators of a sand dredge in the Ohio River placed a sheet of rubber at the discharge of a 36-inch conveyor and there was concentrated over a very small area in a period of seven months the impact and scouring action of 250,000 cu. yds. of sand and gravel.

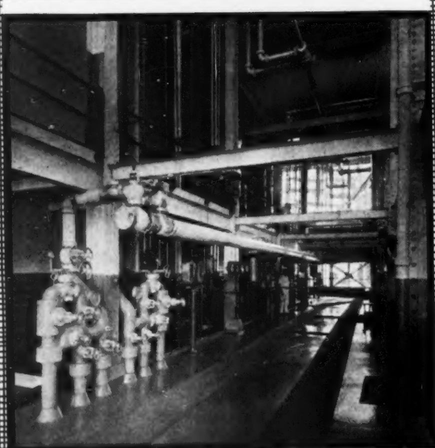
Ball Mill Linings

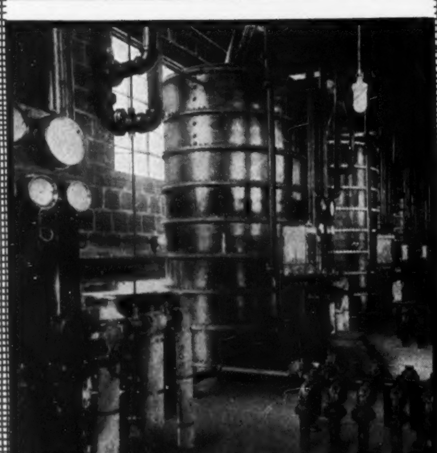
Limited application has been found for rubber linings in rotary grinding mills. Linings have been in use since 1921. After the first few installations had been made and the basic principles found to be sound, the development of a commercial lining was considered along two separate lines: First, to produce a standardized lining which could be installed in the field without making any objectionable or costly changes in the construction of the mill, at the same time giving the rubber a positive anchorage in the mill, and eliminating metal from wearing contact. Second, to determine the limitations of the lining in regard to varying conditions of operation, so that recommendations could be made to prospective users.

It was found that in most dry grinding operations heat is generated by friction, which sometimes builds up a temperature sufficiently high to cause premature

Complete Plants







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If the process is a new one Badger chemists study it in the laboratory, investigate sources of raw materials, disposal of wastes and recovery of by-products. When necessary an experimental plant is erected and operated to obtain data.

Badger engineers design the plant, bringing into play all the experience gained in years of such work. They do not confine themselves to the chemical factors, but insure adequate and economical power and process steam, electricity, lighting, ventilation and receiving and shipping facilities.

Details of special equipment receive the study their importance demands. Each item is designed by a Badger engineer with long successful experience in that branch, whether it be distillation, evaporation, drying, extraction or what not.

The erection of the plant is supervised by Badger field engineers who stay on the job and guarantee the translation of promise into performance. When required, we train the men who are to operate the plant and stand by the owner until he is entirely satisfied to "drop the pilot."

All these services are backed up by a strong business organization. The advantages of the centralized responsibility such a system offers have been appreciated by the many owners of Badger plants ranging in cost from a few thousands up to millions of dollars.

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failure of a rubber lining. Rubber linings should not be considered for dry grinding applications where the temperature exceeds a conservative limit of 150° F. Laboratory and field tests show that severe impact varies in direct proportion to the thickness of the rubber. Therefore, as the size of individual balls, which make up a grinding charge, increases, a rubber lining must increase in thickness in proportion sufficient to absorb the impact without a damaging effect. From the many tests it has been concluded that the rubber lining is best suited for cylindrical type mills used in the wet process grinding of fine materials, requiring small balls, that give a large grinding surface.

Battery of rubber-lined tanks designed to hold glacial acetic acid

Some chemical manufacturing operations require pigments to be ground in contact with corrosive liquors. This presents a problem of protecting the interior of the grinding mill from corrosion as well as abrasion. Rubber offers a solution to this combination, and the Vulcalock process makes it possible to line a mill completely without seams, so that corrosion protection is complete and positive.

Cutless Rubber Bearings

The Vulcalock process has made possible the use of rubber for bearings on certain machinery where it is not practical or convenient to lubricate with oil, such as shafts running in water on ships, hydraulic power turbines, sand and gravel pumps, deep well pumps, agitator bearings in chemical plants and in many other places where water or other lubricants not injurious to rubber are available for lubrication.

Babbitt, bronze and other hard surfaced bearings have held undisputed power as bearing surfaces so long that it is difficult to imagine anything taking their places. It becomes easier, however, when one considers that rubber properly compounded and vulcanized will stand abrasion much better than bronze, babbitt or even steel.

Cutless rubber bearings consist of a metal sleeve lined with a tough, resilient compound similar in texture to the rubber tread of a high grade automobile tire.

Rubber, like water, is practically non-compressible and is capable of supporting a shaft of great weight with negligible deflection. Another property of rubber underlying its success is the low coefficient when wet. It is commonly known that rubber heels tend to slip when wet and that automobile tires skid on wet streets. In spite of these familiar examples, the Cutless Bearing is probably the first application of this property in the engineering field. Years of continual use on all classes of equipment up to 30 inches inside diameter has proved the cutless rubber bearing beyond question to be better fitted for certain conditions than any other bearing now on the market.

Equipment Bulletins

A. O. Smith Corp. has just issued Bulletin No. 510 describing the "New Way of Designing and Building Gas Lines With Smithwelded Pipe".

Specialties Division of the National Lead Co. has announced a new catalog describing the Simonson-Mantius Vacuum Process for the recovery and concentration of sulfuric acid.

The Brown Instrument Co. is featuring the Brown Flame Analyzer for checking the heating effect of fuel gas.

Standard Conveyor Co., the use of belt and roller conveyors in the chemical process industries is described and illustrated in a seven page pamphlet.

Sherman Corp. has issued leaflet describing engineering analysis of materials handling problem in Philadelphia plant of Container Corp. of America, solution of which effected saving of over $40,000 yearly.

F. J. Stokes Machine Co., Philadelphia, has issued booklet about new high vacuum pump, which is especially suited for all purposes where a high vacuum is required.

Combustion Engineering Corp. has issued catalog describing new underfeed stoker.

Link-Belt Co. has issued folder describing "Cub" portable belt conveyor.

Hungerford & Terry, Inc., have issued catalog describing water purifying apparatus.

New Cyanamide Process

A process, according to the *Chemical Trade Journal*, is being developed by the French chemist Reitzyne, for the manufacture of calcium cyanamide without the intermediate production of calcium carbide. The process consists in heating carbonate of lime to its dissociation temperature (600° to 800° C.) in the presence of ammonia gas. The material produced is stated to be a mixture of ammonium carbonate and cyanamide, and to have a nitrogen content of 35 per cent. The process has been modified by the German chemists, Franc and Heimann, who work in the presence of carbon monoxide, and of cobalt fluoride as a catalyst. The carbon monoxide reacts with part of the ammonia and with the lime to form calcium cyanide, which under the conditions of the process is converted into cyanamide.

Hanson, Van Winkle & Munning Co., Matawan, N. J., manufacturer of polishing and plating equipment, has established plant at Anderson, Ind., employing about 200.

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2—J. P. Devine Co., Vertical Dust Filters 44" Dia. 6' high.
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5—Sprout Waldron & Co., Muncy, Pa., The Monarch 9" x 24"
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Battery of 5 Dust Recovering and Conveying Co., Cleveland, Ohio
Perfecto Dust Filters. Ea. 36" x 8 ft. 10" high.
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Direct Connected G. E. Motor, G. E. Starting Compensator, and G. E. Relay Panel.
Also G. E. Motors: 1-75 HP, 1-30 HP, 1-25 HP, 1-10 HP, 1-7½ HP.

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Modern Boiler
Feed Water Treatment Methods

By A. E. Warner*

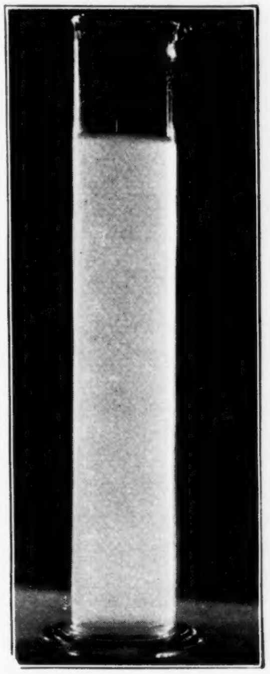
BOILER feed water treatment is probably the least understood of any subject connected with the generation and use of steam power. Due undoubtedly to the little available information concerning it, the industrial power plant has not, until very recently, received the consideration of manufacturers that its importance deserves. In many plants appropriations are withheld for power plant improvements that if made would actually pay for themselves within a short time.

The manufacturing process, new and improved machinery, have always had first place in the affections of manufacturing executives. To-day thousands of concerns keep no record of power costs except as a lump sum. If plant executives knew how much improperly treated boiler feed water actually costs in fuel, lubrication, boiler and engine repairs, boiler cleaning, etc., the facts would prove startling.

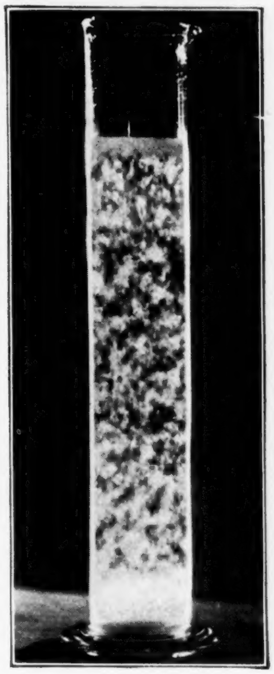
In the introduction to his address before the American Gas Association on May 29th, 1929, Sheppard T. Powell, consulting chemical engineer, said:

"The losses occurring in the generation of steam either for power or process uses, due to bad feed water and to inadequate control of boiler water concentrations are enormous. A full realization of these losses by the management of public utility corporations or private industries would result in more detailed attention to this portion of their plants.

"Much has been written concerning methods of analyses of feed water, but little information is available to indicate the specific importance of such data in the control of steam stations and little data have been published concerning the economic value of such control. It is largely for this reason that many companies have not been impressed with the necessity or the value of this work. The saving resulting from accurate control of the feed water systems by routine chemical analyses can be easily demonstrated and plants where accurate cost records have been kept can verify these statements. So much depends on the constancy of service from the steam station that any neglect or inefficient control of this portion of the plant must sooner or later be reflected in reduced efficiency of the entire plant. This holds true not only in central station practice and in the gas industry, but in all industrial activity.



Showing foggy appearance of water treated with lime and soda ash



Showing coagulation produced with lime, soda ash and sodium aluminate

"Heavy losses have been sustained during the past two years in some of the largest industries in this country from bad feed water conditions which could have been prevented had the steam stations been under proper analytical control.

"During the year, a large national organization has sustained a financial loss running into six figures by failure to recognize the importance of chemical control of the feed water system. Within the past month a boiler failure has been reported which could have been avoided by routine chemical analyses of the concentrated boiler waters. Such analytical data would have indicated the corrective feed water treatment re-

*National Aluminate Corp.

quired. It would hardly seem necessary to direct attention to these problems were it not for the fact that failures are occurring many of which could be avoided."

For years practically the only treatment used consisted of a boiler compound of unknown composition. The chief ingredients were caustic soda, soda ash, or sodium silicate or combinations of these with which tannin might be included. These chemicals are all of value in treating some waters when used in the proper quantities. However, the engineer followed standard instructions and used so much compound per day per hundred horsepower or per thousand of gallons of water evaporated.

Lime-Soda Plants

The engineer had no means of knowing how effective the treatment was until the boiler was opened. If the boiler was fairly clean the compound was all right; if the boiler was badly scaled then the compound was unsatisfactory.

This method, or lack of method, is still followed in many plants, but the number has been greatly reduced through the introduction of modern scientific methods.

Perhaps the most important step in treatment of water was the introduction of the lime-soda external treating plant. The initial cost and maintenance of these plants kept them from being generally adopted, and only a small percentage of steam plants are equipped with lime-soda softeners.

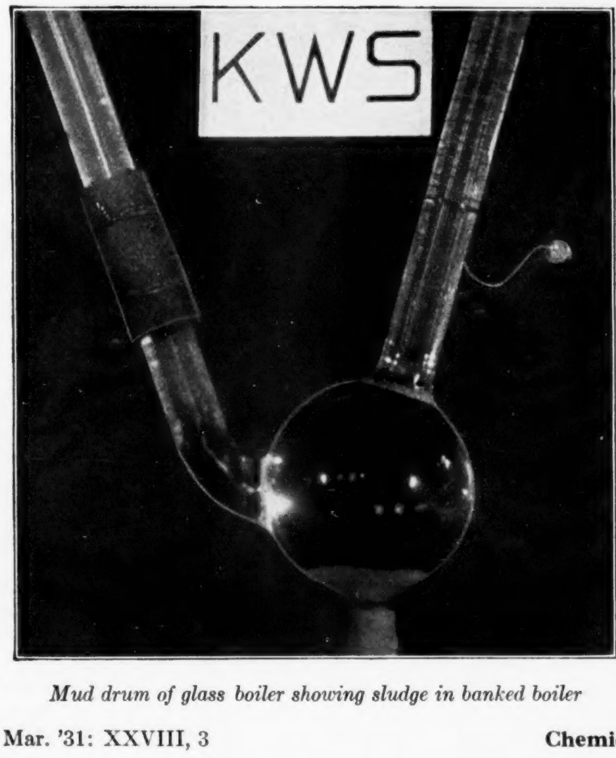
New plants, especially those of high pressures and ratings, now provide liberally for feed water treatment. These plants cannot operate successfully without the very best water obtainable. Evaporators have also come into use and of course, these have to be descaled. Some of the most modern plants make use of combinations of lime-soda softeners and evaporators so as to take a large part of the load off the evaporators.

One large plant first filters the water, then treats with lime and sodium aluminate, then passes it thru a zeolite softener and finally treats with acid to restore the carbonate-sulfate ratio to prevent boiler plate embrittlement.

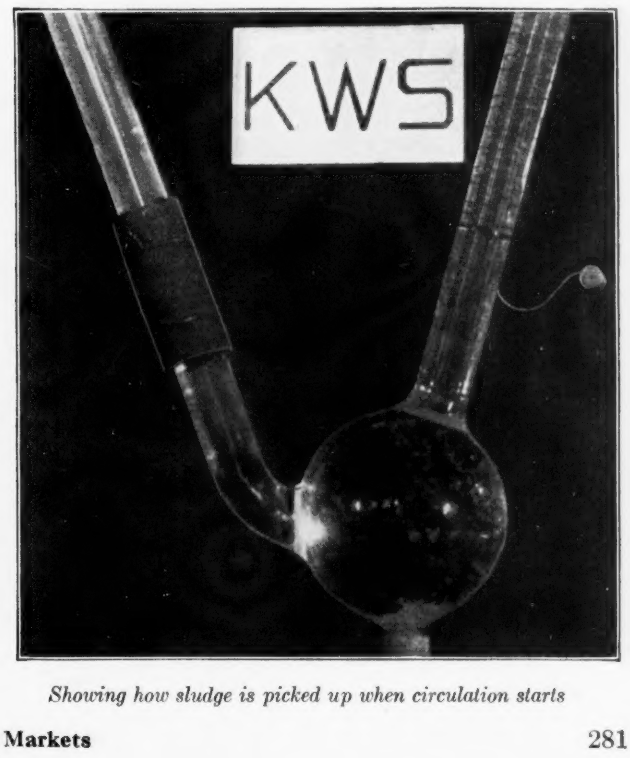
Sodium Aluminate Introduced

The introduction of sodium aluminate a few years ago was a decided improvement in the treatment of boiler feed water both directly in the boiler and in lime-soda softening plants. Sodium aluminate was not a new chemical, for early investigators knew something of its properties as a coagulant. However, it was not on the market in usable form. At first it was sold only in liquid form, but could be kept in stable form only when hot. This was a grave difficulty which was eventually overcome. It was first used to replace boiler compounds and rules governing its successful use under the wide variety of water and operating conditions prevailing had to be developed.

Use of this chemical gradually developed into a system which made use of the best information available. Guess work was removed by testing the raw water to determine the theoretical treatment necessary just as is done with lime-soda plants, but omitting the lime as the heat breaks down the bicarbonate hardness. The treatment is then introduced into boiler and a sample of the treated water taken and analyzed. The treatment is then corrected and the boiler water is tested daily. The engineer has thus a flexible, definite



Mud drum of glass boiler showing sludge in banked boiler



Showing how sludge is picked up when circulation starts

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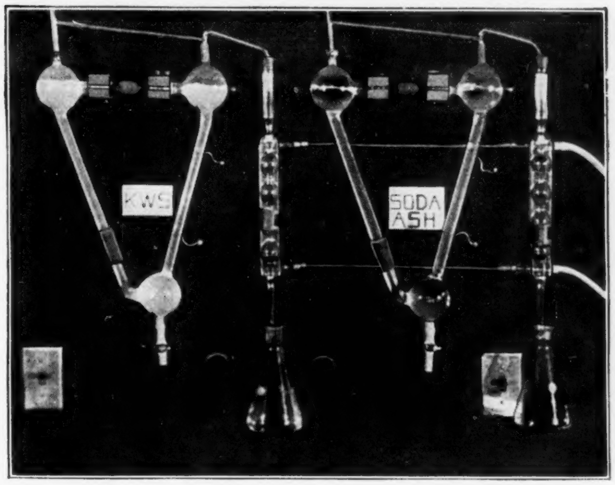
system of taking care of changes in the water as fast as they occur. This system includes tests to determine the carbonate-sulfate ratio for the prevention of caustic embrittlement and by further tests enables the operator to maintain scientific control of blowdown.

While sodium aluminate has played an important part in the revision of water treating in the boiler it has also done an equally serviceable job in lime-soda plants. While the lime-soda plant was one of the most important developments, the method was still far from being perfect, due to the natural limitations of the chemicals which are quite rapid in their reactions in the higher ranges of hardness. When, however, the reduction in hardness approaches the ultimate, the speed of reaction slows down and requires hours or even days to come to completion. Large excesses overcame the difficulty but the water became unsuitable for boiler use. The alternative, unless an excessively large plant were built, was scale in pipe lines and boilers. Some plants used aluminum sulfate or ferrous sulfate as coagulants to speed up the lime-soda reactions. Both are acid coagulants and add hardness to the water which requires additional lime and soda ash again producing a water high in soluble salts.



Glass Boilers used in experiments on Foaming and scale formation. A Motion Picture of these boilers in operation has been made

Sodium Aluminate Not a "Cure-all"

Sodium aluminate rapidly found favor because, being an alkaline coagulant and possessing softening qualities of its own (it is rapid and positive in reacting with magnesium) the rapid completion of lime and soda ash reactions was obtained and at the same time reduction of the amount of lime and soda ash used. Where undertreating was practised to prevent foaming, sodium aluminate permitted the use of adequate treatment. Sodium aluminate is also specially valuable in removal of silica, the most troublesome of encrusting salts as well as the most difficult to remove.

The value of sodium aluminate lies as much in the intelligence with which it is used as in the chemical itself. It is no cure-all, but in spite of its limitations, has improved water treating methods, lowered the cost of water treating, and saved millions of dollars to American industries. Boiler feed water treatment, for so many years the step-child of the power plant, during the past five years has received more attention.

Study and research are now at the highest point ever achieved. The work of Parr and Straub, of Illinois, on embrittlement is succeeded by a study of water treatment for high pressures; Foulk at Ohio State is continuing work on foaming; Hall is building up a case for phosphates; Partridge at Michigan is studying scale formation while Holmes and Christman are studying aluminates and their effect in conjunction with other chemicals, on scale formation and foaming. Capt. Dinger of the Navy is also making independent studies at Annapolis. When all the facts developed by these studies are assembled and coordinated the science of feed water treating should be considerably advanced.

The work being done is of interest to those companies who have installed or contemplate the installation of high pressure steam generators. Perhaps they should be called "super-high" to distinguish them from the old "high" pressure types. Scale, corrosion and foaming are still costing the industries of America millions of dollars annually that can be saved by present methods of treating feed water. This is due to ignorance and indifference. Education while slow is probably the only cure.

Do you know how your boiler feed water is treated, how much the treatment costs, how effective it is or whether it can be improved? If you can't answer these questions you are not an exception, but should you not be able to answer them? Do you know whether your fuel, lubrication, boiler cleaning and repair bills are normal or excessive? Do you know whether these costs are increasing or decreasing? Do you keep any understandable and itemized costs of power production? An investigation of this subject may reveal very interesting possibilities for savings.

Incorporations

Caribbean Trading Co., New York, chemicals—Binder Bros., 200 shs. com.

Tar Distilling Corp., New York, manufacturing—U. S. Corp. Co., Del., 1,000 no-par shs.

California Industrial Alcohol Co., Ltd. Philadelphia—Corp. Guarantee & Trust Co., $250,000, 25,000 shs. com.

Petrolite Corp., Ltd., Wilmington, Del., chemicals, Corp. Trust Co.,—266,667 shs. com.

Pinetrine Co., New York, chemists—E. A. Rogers, $20,000 pfd., 100 shs. com.

Ozero-Zel Laboratories, New York, chemicals—J. M. Baum, 100 shs. com.

Dusco Chemical Co., Poughkeepsie—L. B. Muckenhoupt, 5,000

Berry Solder Co., New York, chemicals—I. D. Neustein, 50 shs. com.

Safety Process Co., New York, chemicals—Stern & Reubens, 500 shs. com.

Sin, Atlantic City, chemists—Harcourt & Steelman, 125,000.

Sno-Melt, Inc., Newark, N. J., manufacture chemicals—Osborne, Cornuso & Scheck, 1,000 shs. com.

A. Klipstein & Co., Inc., Wilmington, Del., chemicals—Corp. Trust Co., 10,000 shs. com.

Lummis Co., Wilmington, Del., petroleum, chemicals—Corp. Trust Co., 100,000 shs. com.

U. S. Tung Oil Co., Inc., Wilmington, chemical manufacturing—Corp. Fiscal Co., $1,250,000 and 22,000 shs. com.

Longman & Martinez, Brooklyn, chemicals—R. Ballantine, 500 shs. com.

Swansdown Sales Corp., New York, chemicals—no filer given, 10,000.

Chilean Chemical Corp., Wilmington, chemical products—Corp. Service Co. 35,000.

Esmonds Mills Ltd., Granby, Que., textiles—1,000 no par shs.

Steadfast Rubber Company, Canada, Ltd., Montreal, Que.—$50,000.

La Gerardine (of Canada) Ltd., Toronto, Ont., chemicals—4,000 no par shs.

Wooden Barrels in the Chemical Industry

(Part II)

By Louis F. Horn*

The first of this series appeared in the February issue and described the slack barrel. The following article concerns the tight barrel and the shipping specifications 10A.

The Tight Barrel is a water-tight container used for the packing and shipping of liquid and semi-liquid chemical products, among which may be mentioned the following:

Acetic Acid
Acid Phosphate
Acetone
Alcohol
Amyl Acetate
Aluminum Chloride Solution
Arsenate of Lead Paste
Barium Chloride
Benzine
Bi-Sulfite of Soda Solution
Carbon Bisulfide
Cements, Liquid
Chromic Acid
Collodion
CrudeOil, Petroleum
Ether
Gasoline
Red Lead
Lacquer
Litharge
Methyl Acetate
Paints
Pentane
Pyroxylin Solution
Toluol (toluene)
Varnish
Shellac
Wood Filler, Liquid

The Tight Wooden Barrel is manufactured from the hardwoods, white oak, red oak, chestnut oak, Douglas fir and spruce, being generally used for barrels that carry chemicals. Laboratory tests have been made to obtain a better knowledge of the action of acids and chemicals on wood barrels, and to determine the particular kind of lining that may be required, such as glue, silicate, paraffin, rubber, asphaltum, or a mixture of paraffin and rosin. The staves, heading and hoops used in the manufacture of tight wooden barrels are thicker than those used for slack barrels.

The capacity of tight barrels for chemicals ranges from five to fifty gallons. They carry up to eight hundred pounds in weight, depending on the density and character of chemical packed. While a variety of sizes to meet individual needs is employed, the standardization of tight staves, heading and hoops, according to the Grade Rules and Specifications adopted by The Associated Cooperage Industries of America for its Tight Cooperage Group, and the simplification efforts put forth, have brought about a tendency to reduce the number of sizes of wooden barrels. The most common are:

Size	*Length of Stave*	*Diameter of Head*	*Approximate weight empty oak barrels*
50 Gal.	34″	20½″	70 pounds
30	30″	16-⅝″	44 "
20	24″	15-½″	32 "
15	24″	13-⅜″	24 "
10	21½″	12″	20 "
5	17″	10″	12 "

A great number of chemicals and basic raw materials, such as acetic acid, acetone, alcohol, arsenate of lead paste, benzine, ether, gasoline, lacquer, varnish, shellac, etc., that are packed in tight wooden barrels, are governed by regulations and container specifications established by the Interstate Commerce Commission, in cooperation with the Bureau of Explosives, the Manufacturing Chemists' Association and The Associated Cooperage Industries of America, and a revised set of these specifications, effective October 1, 1930, is quoted below:

1. No unprotected projections from or through any part of container are permitted.
2. Hoops must be redriven prior to shipment. As redriven, bilge hoops must have 28 per cent, or less, of length of stave between them.
3. Reused and reshipped containers, before refilling, must be cleaned inside and relined as prescribed herein, and hoops must be redriven.
4. Maximum tolerance of 10 per cent is authorized in capacities of containers specified herein.

Staves and Heading

5. (a) Staves and heading must be of white oak, chestnut oak, red oak or Douglas fir, and as follows:

(b) Free from rotten sap, checks, and seed and worm holes, also pitch pockets, cat faces and other defects that show through on both sides. Staves and pieces of heading with five or less holes in each shall be acceptable, provided that the total number of holes in any container must not exceed 15.

(c) Thoroughly and uniformily kiln dried. Moisture content at time of jointing must be between 7 and 11 per cent, both inclusive.

(d) Quarter sawed with the grain, from straight grained timber. No annual ring shall slope over half the thickness of stave or head

Staves

6. (a) In addition to foregoing: Staves must be sawed evenly and circular, and uniformly equalized throughout.

*Secretary, The Associated Cooperage Industries of America

(b) When finished on the outside, staves must be as follows with respect to number and dimensions:

Capacity (gals.)	Maximum Length	Width	Bilge Circle	Minimum Staves	Thickness
	Inches	Inches	Inches	Number	Inch
50..........	34	5½	84	19	¾
30..........	30	5	74	16	⅝
15..........	24	4½	54	14	9/16
10..........	22	4¼	50	12	½
5...........	18	4	40	10	½

Foregoing thicknesses are of staves finished on one side. One sixteenth inch must be added for unfinished staves.

Foregoing maximum lengths are authorized to be increased six per cent or less, provided the thickness of stave is increased at least one-sixteenth inch for each increase of one inch in length or fraction thereof.

(c) Croze center must be within 1-⅛ inches of end of stave.

(d) End of stave must have at least one-eighth inch free from bevel.

(e) Finishing of staves on the outside must be by planing, or container may be finished by sand belt. Turning or lathing is forbidden.

(f) Stave joints must be reasonably flush on the outside. Worm and seed holes, as authorized in finished containers, must be properly plugged.

7. (a) Heading must be, in addition to the foregoing: of uniform thickness and properly circled to required size.

(b) Planed on the outside and properly jointed and glued, or doweled or flagged. Diameter of dowel must be five-twelfths or less of thickness of head.

(e) After planing, as follows with respect to number of pieces and dimensions:

Maximum Capacity (gallons)	Pieces	Minimum Diameter	Thickness	Width
	Number	Inches	Inch	Inches
50................	6	21	1	2-½
30................	6	18	11/16	2-½
15................	5	14	11/16	2
10................	5	13	⅝	2
5.................	4	11	⅜	2

8. (a) Hoops must be made from cooperage-grade hoop steel, and as follows:

Carbon content: at least 0.16 per cent.

Tensile strength: Maximum 90,000 pounds per square inch.

Elongation in eight inches: at least 15 per cent.

(b) Hoops must be as follows with respect to number and size

Maximum capacity of container gals)	Minimum Number of Hoops	Minimum Size of Hoops (Inches in width and Birmingham gage) — Head: Inches	Head: Gage	First Qtr.: Inches	First Qtr.: Gage	Second Qtr.: Inches	Second Qtr.: Gage	Bilge: Inches	Bilge: Gage
50.........	8	1-¾	16	1-½	18	1-½	18	1-¾	17
30.........	6	1-½	17	1-¼	19	..		1-½	18
15.........	6	1-¼	18	1-⅛	19	..	..	1-¼	19
10.........	6	1-⅛	19	1	19	..	..	1-⅛	19
5	6	1-⅛	19	1	19	..	..	1	19

Closures

9. (a) Bungholes must be tapered and efficiently closed by tapered bungs. Efficient means must be provided for holding bungs securely in place and preventing leakage in transit.

(b) Vent bungs, if used, must be in the head bearing prescribed marks.

(c) Wooden bungs used in liquid shipments must be of compressed type, diameter two inches or less, covered with suitable

coating, have driving fit, be soaked in hot water or hot glue for about one minute before driving, and be driven so grain of bung runs with grain of stave.

Lining

10. (a) Containers must be completely coated or lined with animal glue, asphaltum, pure rubber, paraffin, or mixture of paraffin and rosin, or as further provided.

(b) Lining is authorized to be omitted at the request of purchaser. Lining is authorized to be omitted when paper-bag lining is used as approved by these regulations.

11. (a) Glue for lining must be good grade animal glue, at least equal to Peter Cooper's Standard 1-¼, must be reasonably free from foam, and remain sweet in hot solution for at least 48 hours.

(b) Glue must be applied to new containers in two or more coats. Deposit of glue must be at least 0.02 of a pound, dry weight, for each gallon capacity of container. At least one coat must be applied to other than new containers prior to each reshipment. One coat of silicate of soda of proper consistency and properly applied is authorized to be substituted for the first coat of glue. Temperature of glue shall at no time be raised above 180 degrees F.

12. (a) Asphaltum for lining must comply with the following:

Specific gravity at 77 degrees F.0.95 to 1.00
Melting point .... 170 degrees to 210° F
Flash test .... 450 degrees F. minimum
Fire Test .... 550 degrees F. minimum
Penetration:
At 32 degrees F., 200-gram weight, in 1 minute, 30 millimeters or more

(b) Asphaltum lining must be applied to natural surface of wood, not previously coated, at temperature of about 400 degrees F., and under self-generated pressure.

13. (a) Paraffin, or paraffin and rosin mixture, must be applied to the natural surface of wood, not previously coated. Wood must be dry and hot and paraffin or mixture at about 190 degrees F.

14. (a) Rubber for lining must be free from sulfur, specks of foreign matter and any perceptible defects.

(b) Rubber lining must be uniformly distributed over the entire interior surface of container, including closing devices, and applied so as to afford proper protection against leakage.

(c) Rubber lining in sheet form must weigh at least 20 ounces per yard. Seams must be cemented and interliner used between rubber and wood of barrel. Interliner must consist of two plies of creped No. 1 kraft paper cemented together with asphaltum and having base sheet weight of at least 90 pounds.

(d) Rubber lining not in sheet form must be coated directly onto interior surface of barrel. At least 0.14 pound of rubber per square foot of interior surface must be used.

Tests

15. (a) Containers must be given pressure tests by manufacturer. Pressure must be either self-generated at time of sizing, or air pressure of at least 5 pounds per square inch.

(b) Containers must be rejected for leaks due to defects prohibited herein, or defective parts must be replaced and containers again tested. Other leaks must be properly repaired and containers again tested.

(c) Containers two days or more old must be able to pass stave-spring test. Test shall consist of removing all hoops above the bilge of barrel so that staves spring outward. Outside diameter at the head must not increase over 10 per cent.

Marking

16. Each container must be plainly and permanently marked by manufacturer with hot branding irons, in letters and figures at least ¾ inch high, as follows:

(a) I C C—***, on the head, near vent bung if any; the stars to be replaced by specification number which the container was made (for example, I C C—10A, I C C—10B, etc.). This mark shall be understood to certify that the container complies with all specification requirements.

(b) Date of manufacture, directly under above marks (for example 7-28, indicating month and year).

(c) Name, mark, or initials of manufacturer on bung stave between bilge and quarter hoops. This must be recorded with the Bureau of Explosives, 30 Vesey Street, New York City.

Shipping Container Specification 10B

1. Containers must comply with all provisions of specification 10A, except as follows (paragraph references are to specification 10A).
2. Staves in 50-gallon container, paragraph 6 (b), with thickness of at least 11/16 inch are authorized.
3. In place of table in paragraph 7 (c), the following:

Maximum Capacity (gallons)	*Minimum*			
	Pieces	*Diameter*	*Thickness*	*Width*
	Number	*Inches*	*Inch*	*Inches*
50	6	21	¾	2-½
30	6	18	⅝	2-½
15	5	14	9/16	2
10	5	13	½	2
5	4	11	½	2

4. Head hoops, with minimum width and thickness prescribed for bilge hoops by paragraph 8 (b), are authorized.

Shipping Container Specification 10C

(Same specifications as Paragraphs 1, 2 and 3 of 10B).

Paragraph 4 provides: Head hoops, with minimum width and thickness prescribed for bilge hoops by paragraph 8 (b), are authorized. Second quarter hoops not required.

Approximately two hundred and fifty gallon barrels constitute a carload. It is often said that a barrel handles itself, meaning by reason of its shape, that it is so easily rolled, steered, and up-ended. In unloading barrels, reasonable care should be exercised. Whenever possible they should be rolled down a skid or runway, rather than dropped out of the car door to fall wherever they choose. When barrels have to be hoisted, the chime at each end forms a quick convenient grip for hooks and grapples, and if found necessary to drop the barrels, they should be dropped on the side or bilge, not on the head or chime, as the bilge resists the greatest strain, the chime the least.

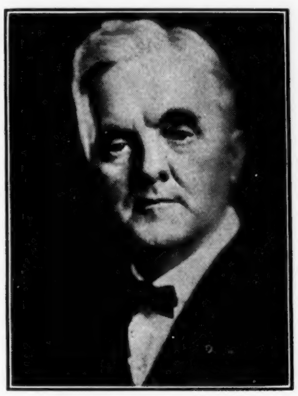
Both the slack and tight barrel can be used, emptied and reused many times. For instance, an I. C. C. No. 10 barrel can be first filled with alcohol, shipped to the paint manufacturer, emptied, filled with shellac, and sent on its way again and again. In fact the life of the Tight Barrel cannot be computed, as it withstands the hardships of endless trips.

The cooperage industry in cooperation with individual chemical manufacturers, has devoted considerable time and thought to the subject of improving barrel service to the chemical and allied trades, particularly with reference to specific commodities and the principles that govern their proper packing. With an accurate knowledge of these fundamentals, it is a comparatively simple problem for the chemical producer and the cooperage manufacturer to decide upon the kind of barrel best suited for shipping various chemical products and basic raw materials.

Chemical Facts and Figures

"Norris" Muscle Shoals Compromise Passes Congress—Is Vetoed By President Hoover—Senate Fails to Override—DuPont Announces Nitrocellulose Patent Terms—Logue Appointed Research Director of Swann.

After ten years of debate the Congress of the United States weary of the issue and willing to accept almost any kind of legislation acceptable to those directly interested finally on February 20-23 passed the compromise measure arrived at at a conference of the Senate and House conferees held on February 18. The vote in the House on Feb. 20 stood 216 for and 153 against the measure and in the Senate (Feb. 23) 55 to 28. The passage of the bill was considered in most quarters as a victory for Senator Norris.



Senator Norris

After months and years of aimless delay the final and semi-final acts of this prize "one-ring circus" moved with startling rapidity. On February 9, Representative Wurzbach submitted a new compromise proposal. Under it not less than 85 per cent of the power output would be used for fertilizer production and not more than 15 per cent for manufacturing chemical by-products.

Later four of the House conferees—Ransley, Reece, Wurzbach and Fisher—addressed a letter to the Senate conferees requesting an opportunity to meet again, and failing to agree, to sign a formal report of disagreement. They stated that "in their opinion the conference would result in disagreement and that the two Houses should have an opportunity during this session to take further action if they wish."

The Senate and House conferees met again on the 13th without reaching any agreement on this or other proposals. However, quite unexpectedly the conferees on the 18th found at last a mutual basis to work on and reported favorably on the "Norris Muscle Shoals Bill," to their respective associates. With surprising alacrity both houses passed the measure and forwarded it to the President for his approval or veto.

Compromise Measure

The compromise bill provided for direct government operation of the power plant. with authority given a board of three managers, to be appointed by the President, to erect power lines and sell power to communities or other purchasers.

The demand of the Senate for government operation of the nitrate plants was vetoed in favor of the following legislation:

The President is instructed to negotiate a lease of the nitrate plants with private interests within twelve months after the bill is enacted into law. The contract for the plants would be for fifty years, with the monthly rental to be fixed by the President.

The lessee of the plant would receive a preference on power produced for the manufacture of nitrates, with the stipulation that he might have additional power, equal to 15 per cent of that used in manufacturing nitrates for fertilizer, to use as he saw fit in other ways in plants separate from those leased by the government.

Senate Muscle Shoals Vote

FOR THE CONFERENCE REPORT—55

Republicans—20

Blaine	Johnson	Pine
Borah	Jones	Robinson (Ind.)
Brookhart	LaFollette	Schall
Capper	McNary	Steiwer
Couzens	Norbeck	Thomas (Idaho)
Franzier	Norris	
Hatfield	Nye	
Howell		

Democrats—35

Barkley	Glass	Smith
Black	Harris	Steck
Blease	Harrison	Stephens
Bratton	Hayden	Swanson
Brock	Heflin	Thomas (Okla.)
Broussard	Kendrick	Trammell
Bulkley	McGill	Wagner
Caraway	McKellar	Walsh (Mass.)
Connally	Morrison	Walsh (Mont.)
Copeland	Pittman	Wheeler
Dill	Robinson (Ark.)	
Fletcher	Sheppard	
George		

AGAINST CONFERENCE REPORT—28

Republicans—26

Bingham	Hebert	Phipps
Carey	Kean	Reed
Dale	Keyes	Shortridge
Fess	Metcalf	Townsend
Glenn	Morrow	Vandenberg
Goff	Moses	Walcott
Goldsborough	Oddie	Waterman
Hale	Partridge	Watson
Hastings	Patterson	

Democrats—2

King	Tydings

Paired

For the Report—Ashurst, Simmons, Williamson; Democrats—3.

Against the Report—Gould, Gillette, Republicans, and Ransdell, Democrat—3.

Not Voting—Cutting, Davis, Deneen, McMaster, Smoot, Republicans; Hawes, Democrat, and Shipstead, Farmer-Labor.

Another stipulation in the compromise was that the lessee may not remove fertilizer ingredients from the government plant to use in a private plant for manufacture of other products such as chemicals and dyes.

The government was to build another steam power unit at Muscle Shoals, making a total of 220,000 horsepower available at the Shoals. This, with the Cove Creek development, (220,000 h.p.) would mean an eventual production of between 400, 000 and 500,000 primary horsepower with the complete project.

Of the secondary power available, the compromise provided, the lessee of the nitrate plants might have any proportion of it for private use that the President sees fit.

Muscle Shoals Corp.

The compromise bill retained the original Norris provisions (S. J. Res. 49) creating a Muscle Shoals Corporation to have charge of production, distribution and sale of electric power. The corporation was authorized to build transmission lines, complete the dam at Muscle Shoals, build another unit to the steam plant, and to build Cove Creek Dam. It also provided for payment of 5 per cent of the proceeds from sale of power at Muscle Shoals to Alabama and 5 per cent of the proceeds from the sale of power generated at Cove Creek to Tennessee.

The compromise provided for leasing the nitrate plants for the exclusive production of fertilizer and fertilizer ingredients. If the lease was not made by the President within 12 months, provisions for leasing became void and the Government would operate the plants for experimental production of fertilizer as provided for under the original Norris bill.

Lease Terms

The leasing agreement provided that the nitrate plants would be leased at a rental that the President deemed "fair and just." The lessee had to within 3½ years produce 10,000 tons of fixed nitrogen with periodic increases thereafter until the capacity of the plants was reached within 12 years, if market demands justify. At least 2,500 tons of fixed nitrogen must be carried in storage. Profit was limited to 8 per cent.

Further: "The lessee shall covenant to operate said plants and use said property exclusively in the production and manufacture of fertilizer and fertilizer ingred-

ients to be used in the manufacture or production of fertilizer and if, in the manufacture of fertilizer or fertilizer ingredients, a by-product is produced which is not an ingredient of fertilizer, the lessee shall have authority to sell and dispose of such by-product so as to prepare the same for a market.

"Provided, however, that in consideration of the lessee complying with the requirements as to the manufacture of fertilizer as prescribed in subsection (d) of this section (this refers to points outlined in paragraph 5 of this item) the lessee shall have the right during the term of the lease to purchase, under provisions of section 26 hereof, an amount of primary power from the corporation equal to 15 per cent of the amount of power used by the lessee in the production of fertilizer."

President's Statement

On February 28, President Hoover issued the following statement from the White House in answer to telegrams from governors of the Southern States urging approval of the measure.

"In acting on the bill I have to consider whether it is desirable to adopt a change in Federal policies from regulation of utilities to their ownership and operation; whether the lease provision in respect to the fertilizer plant is genuinely workable; whether the method proposed in this bill will produce cheaper fertilizers for the farmers; whether the project is required for national defense; whether the proposals in this bill are in reality in the interest of the people of the Tennessee Valley, and in general to consider the commonplace unromantic facts which test the merits and demerits of this proposition as a business, then be able to state my views upon the problem."

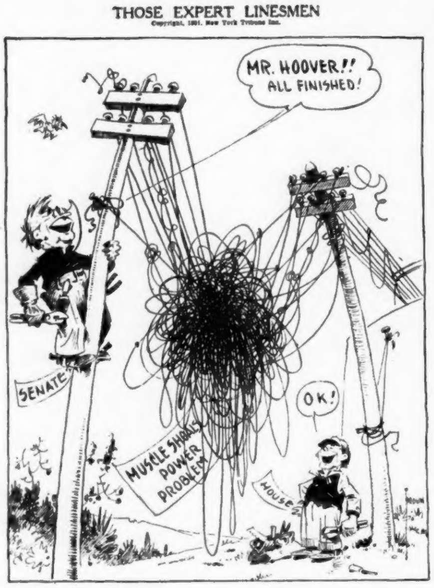
Bill Vetoed

As was expected President Hoover vetoed (March 3) the "Norris Muscle Shoals Bill", instead of permitting it to die through a pocket veto. His action was sustained by the Senate on the same day, the proponents of the measure being unable to muster the necessary two-thirds vote. The motion to override was lost 49 to 34. Three Senators, Steck, Couzens, and Thomas who voted for the measure originally, switched their vote to support the President.

The bill was returned to the Senate accompanied by a rather lengthy discussion of the measure condemning it in no uncertain terms as a political move rather than an economic solution. Two quotations serve to illustrate the President's viewpoint.

"I am firmly opposed to the government entering into any business the major purpose of which is competition with our citizens. It can, however, be stated with assurance that no chemical industry, with its constantly changing technology and

THOSE EXPERT LINESMEN



equipment, its intricate problems of sales and distribution, can be successfully conducted by the government."

As an alternative, President Hoover suggested that the States of Alabama and Tennessee should set up a commission together with representatives from the national farm organizations and the Army to be vested with full authority to lease the plants.

Freeport in Manganese

Freeport Texas Co. has expanded into the manganese field through acquisition of a controlling interest in Cuban American Manganese Corp., owners of extensive manganese deposits in Cuba located about ten miles north of the port of Santiago.

The minority interests of Cuban American Manganese Corp. are represented by David M. Goodrich, chairman of the board of B. F. Goodrich Co., with whom the Freeport Texas Co. has been in close collaboration in the development of these processes and properties. Freeport Texas has previously confined its operations almost entirely to the production of sulfur of which it now is the second largest world producer.

Plans have been completed for the immediate erection of a Cuban plant to treat 1,000 tons of ore a day by new patented processes for the concentration of "beneficiation" of manganese ores which will increase their metallic content to the percentage required by American steel mills.

Initial capacity of the Cuban plant will be approximately 100,000 tons of ore a year containing 50% or more of metallic manganese. Production is expected to be started within a year. This project will require no new financing on the part of Freeport Texas Co.

"Roxon" is the name pyroxylin-coated fabrics industry will be known by. After adopting "Roxon" as a term for the many articles heretofore sold as "imitation leather," twelve of the leading members of the industry have taken the next step of searching for ways and means of presenting the new name to the trade.

Du Pont Patents

Mixed sentiments on the part of the lacquer manufacturers greeted the announcement of the du Pont Co. giving the details of the proposed license agreement for the use of nitrocellulose, in the manufacture of lacquers, one group apparently appearing satisfied to accept the conditions, while another is said to be unwilling to subscribe to the provisions of the agreement.

These provisions as announced call for a royalty of 4 cents a gallon, with a minimum annual payment of $2,000 prior to the validation of the patents by court decision and thereafter 6 cents, with a minimum annual payment of $3,000 and maintenance of such selling prices as may be established by the du Pont Co. Immunity from charges of infringement prior to 1931 is granted to those accepting the present form of license and any future du Pont patents which may concern the basic patents without payment of additional royalty.

This announcement has set at rest various rumors concerning the provisions of the licensing agreement heard in the trade for several months. According to the announcement, du Pont is offering identical agreements to all responsible lacquer manufacturers without any discrimination. The du Pont Co. has not given any assurance that the present form of the agreement will be offered indefinitely.

The solvent as well as the lacquer industry have followed the preliminary negotiations with keen interest. It was reported from reliable sources, however, that the licensing agreement permitted the lacquer manufacturer to purchase solvent requirements in the open market and the following clause incorporated in the agreement confirms this stand of the du Pont Co.

"Nothing herein contained shall be so construed as to require the Licensee to purchase from du Pont any article, material, or other thing, of any character whatsoever, it being understood that no such agreement exists as a condition precedent to obtaining this license and that its continuance shall not be dependent on the observance of any such condition."

Blackstrap Storage

The New York Coffee & Sugar Exchange announced on February 3, that a license has been granted to the General American Tank Storage & Terminal Co. to store cane blackstrap molasses in its tanks at Good Hope, La. At present this company is the only one that has been given a license to store molasses for delivery on the New York Coffee & Sugar Exchange.

Washington

Further delay in placing the new alcohol regulations in effect appeared quite likely as the month closed. It is expected that the order will be postponed at least until April 1. Attorney-General Mitchell has indicated that he will need more time on certain phases of the regulations.

In the regulations, already approved by the Treasury, several important changes have been made. Brandy produced from grapes is placed on a virtual competitive parity with industrial alcohol, while dentists are allowed six quarts of whiskey annually for office use, neither of which is permitted at present.

Methanol Measures

Methanol legislation continued to occupy a prominent place in the chemical news from Washington. As a companion to the bill introduced in the House last month by Congressman Britten, Senator McKellar (Tenn.) has proposed similar legislation in the Upper House.

An echo of the recent discussion involving the preliminary report of Sayers and Yant of the Bureau of Mines on Methanol as anti-freeze was sounded on February 16, when the Senate, by adoption of a resolution (S. Res. 437) sponsored by Senator Broussard (Dem.), of Louisiana requested the Secretary of Commerce to furnish the Senate "copies of all cooperative agreements between the Bureau of Mines and any manufacturer of wood alcohol concerned with the conception, financing, preparation, publication and circulation of information circular 6415."

The resolution further requested the Secretary to inform the Senate of the amount of money paid to the Bureau of Mines or any representative thereof, by any manufacturer of methanol or wood alcohol.

Tariff News

Tariff Commission on February 2nd submitted to the President reports on seven investigations, including ultramarine blue, wood flour.

The commission found that present duties equalized the differences in the foreign and domestic costs of production. The present duty is 3 cents per pound if valued at 10 cents per pound or less, and 4 cents per pound if valued at more than 10 cents per pound. Under the act of 1922 the rate was 3 cents per pound on all ultramarine blue, regardless of value.

The tariff commission has ordered a study of comparative cost of production of domestic and foreign lead. Study will be made in pursuance of a Senate resolution introduced by Senator King (Dem., Utah). Mexico is believed to be the principal competing country.

The Senate Committee on Interstate Commerce has decided that the congested condition of the legislative dockets of both Senate and House is such as to make it impossible to enact at the present session the Capper-Kelly Merchandising Bill which passed the House on January 29.

Secretary of the Treasury Mellon announced on Feb. 24 that the conclusion had been reached by the Treasury Department that "a finding of dumping with respect to manganese ore imported from the Soviet Republic of Georgia U.S.S.R. is not justified," and the Department therefore declined to issue such finding.

Oil Embargo Bill has been definitely killed, at least for the present. The House Ways and Means Committee has decided to stand by the action of the full committee in shelving the Garber oil embargo bill for the remainder of the session.

Amtorg Investigation

Senator Oddie, (Rep. Neb.) has introduced a resolution calling for a senatorial investigation of the relationship between the United States Steel Corporation, the Bethlehem Steel Corporation and Russian exporters of manganese. The Amtorg Trading Company, sales agent for the Soviet in the United States, also would be studied in connection with its business with steel companies.

COMING EVENTS

American Chemical Society, 81st Meeting, Indianapolis, March 30-April 3.

American Institute of Chemical Engineers, Swampscott, June.

American Leather Chemists' Association, Atlantic City, May 27-29.

National Association of Purchasing Agents, Annual Convention, Toronto, Royal York Hotel, June 8-11.

National Fertilizer Association, New Greenbriar, White Sulphur Springs, week of June 8.

Society of Chemical Industry, Montreal Section, Canadian Chemist's Convention, Montreal, May 27-29.

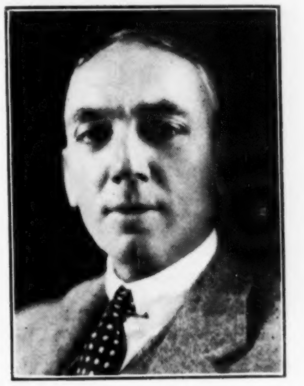
American Society for Testing Materials, Chicago, June 22-26.

Electrochemical Society, Birmingham, Hotel Tutwiler, April 23-25.

Thirteenth Exposition of the Chemical Industries, Grand Central Palace, N. Y. City, May 4-10.

Allied Changes

The board of directors of Allied Chemical & Dye Corp., recently selected C. W. Nichols to serve as chairman of the executive committee during the absence of O. F. Weber, president. C. S. Lutkins was elected a director and appointed executive vice president.



C. W. Nichols

Mr. Lutkins was formerly with the Allied in an executive capacity having been associated with General Chemical Co. for many years prior to its amalgamation with Allied Chemical in 1920. Mr. Lutkins has been a partner with a New York Stock Exchange firm and he now returns to the company. Mr. Nichols, son of the late Dr. Nichols has, of course, been actively connected with the Allied for years. He is also active in the direction of the Nichols Copper Co.

Orlando F. Weber, president of the Allied, has been ill for several weeks and has taken a short leave of absence. C. W. Nichols, as chairman of the executive committee, and Clinton S. Lutkins, as executive vice president, are in charge of the company's affairs in Mr. Weber's absence.

Drum Import Ruling

A very important and perhaps far-reaching decision of the Commissioner of Customs was announced at the New York Customs House at the close of the month. Heretofore, importers of chemicals and allied products packed in metal drums have been permitted to bring them in under the tariff provision for free entry. In the future it will be necessary to prove that the containers were previously exported from the United States in order to gain free entry.

Reports from the Pacific Coast mention a new industry, the Sunland Sulphur Co. reputed placed in operation on a new industrial tract between Fresno, Calif., and Calwa by Mayor Z. S. Leymel and members of the industrial committee of the Fresno County Chamber of Commerce. An initial production of between 4,000 and 5,000 tons is mentioned.

Barrett is making sodium nitrate manufactured at Hopewell, Va., the subject of a radio broadcast to be heard each week from thirteen leading stations in the heavy fertilizer-consuming regions of the South and Southeast. This feature consists of musical programs by the "Arcadians."

The Du Pont Viscoloid Co. has withdrawn, as of February 3rd, from participation in ownership of the Duplate Corporation, the complete control of which has been acquired by the Pittsburgh Plate Glass Co.

The United Chemical & Drug Co., a newly organized concern to sell chemicals, oils and drugs, has purchased the merchandise, formulas, and good will of two of the leading dealers in botanicals, namely, King & Howe, and R. Hillers Son Co.

The company has opened offices at 135 William street, New York City.

H. H. Rosenthal, Inc., brokers in drugs, chemicals and oils, have moved from 177 William street to larger quarters at 25 East Twenty-sixth street, New York City. The new telephone number is Caledonia 5-6540.

Eastman Kodak Co. has decided to pay more than one-half of the company's annual wage dividend three to six months in advance of the regular date of the disbursement. The dividend moved forward amounts to $1,401,893. This action was taken to increase the purchasing power of employees and to help in creating better business conditions.

Texas Gulf Sulphur and Shell Union Oil were sustained in the $10,000,000 suit brought by Fred C. Pabst, et al, when Judge Charles G. Dibrell granted and accepted the general demurrer of the defendants. The plaintiff gave notice of appeal.

Plaintiffs alleged that the defendants leased their lands to drill for oil, sulfur and other minerals, then failed to develop the land properly.

Columbian Paper Co. of Bristol, Tenn. has announced plans for additional chlorine production units.

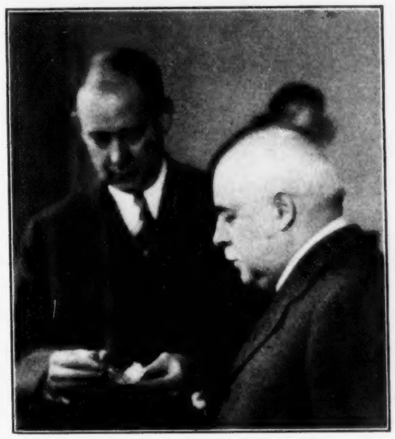
The Alexander Chemical Co., Inc., dealers in textile chemicals for dye houses and specializing in printing gums, has opened offices in the Fair Lawn and Radburn Trust Co. Building, Paterson, N. J. W. P. Alexander is president.

United States Circuit Court of Appeals in St. Louis has upheld the contention of the Standard Oil Co. of New York and the Vacuum Oil Co. that a merger of the companies would not be in violation of the old Standard Oil dissolution decree of 1911.

News of the Companies

W. C. Teagle, president of Standard Oil Co. (N. J.), has announced that the Standard Hydrogenation Corp. has no connection or relation of any kind with the Standard Oil Co. (N. J.), and that it has no license under or rights in the hydrogenation process owned by the Hydro Patents Co., which was sponsored by the Standard Oil Co. (N. J.)

Titanium Alloy Co. will remove its pigment plant from Niagara Falls to St. Louis, Mo., early in March, according to an announcement by Andrew Thompson, vice-president and general manager.



Dr. G. K. Burgess, director of the Bureau of Standards, examines the world's first specimen of distilled chromium, in the hand of L. W. Chubb, director Westinghouse Laboratories

A. K. Hamilton, 95 Wall Street, New York City, sales representative for Pennsylvania Sugar Co. and also Franco-American Chemical Works has opened a sales office at 416 Bukley Building, Cleveland, Ohio. This office is under the direction of Wm. F. Orbison, Western Manager for A. K. Hamilton.

Joseph H. Browne, chemical broker, has announced that he will wind up his present business as of April 1st.

Herbert A. Hirsh, son of the late Adolph Hirsh has announced that he has sold his interest in Adolph Hirsh & Son to Simon M. Goldsmith with whom his father was long associated in business.

Southern Mineral Products Corp., subsidiary of Vanadium Corp. of America, will construct 50 homes for employes at its plant on Piney River near the border of Amherst and Nelson counties, Virginia. The plant is being constructed for the mining and treating of ilmenite ore from which a product will be obtained for use in manufacture of paint.

Interstate Commerce commission has issued an order on petition of duPont Co. Penns Grove, N. J., to permit, effective on February 12, the shipment in tank cars of a new refrigerant known as "dichlorodifluoromethane," by including it in a list of liquefied compressed gases which under the present specifications may now be shipped in tank cars.

A Klipstein & Co., Chicago office is now located at 20 N. Wacker Drive.

The Glidden Co. is announcing to trade that through the research department of its subsidiary, Chemical & Pigments Co., it has developed and is now marketing a new non-fading and non-bleeding red pigment. The pigment is developed by a secret process through using cadmium and selenium metals and is the only red pigment not affected by the sun rays.

F. S. Royster Guano Co., has appealed its income tax dispute to the United States Board of Tax Appeals. The amount involved is $36,702 for the year 1926. The dispute is stated to be much involved and to embrace methods of income tax computation, valuation, and depreciation of the Royster company's plants and losses on its subsidiaries.

The aromatics and fine chemicals division headquarters of the Newport Chemical Works, formerly located at 260 West Broadway, New York, has been transferred to the main plant of the company at Passaic, N. J. The company will continue to operate the New York office as a branch of the division.

Givaudan-Delawanna, Inc., are offering a new product, "Tex-O-Dors" to the textile and finishing trades for deodorizing unpleasant odors in finished goods. At present three types, each with a different odor are available.

Cancellation of the American Cyanamid Company's trade-mark, "Ammo-Phos-Ko," for a fertilizer has been ordered by M. J. Moore, Assistant Commissioner of Patents.

Equipment Companies

Western Precipitation Co., Los Angeles, controllers of the Cottrell process of electrical precipitation, has recently installed the process. The most recent for the International Nickel, at Copper Cliff, Ont., Canada.

Alsop Engineering Corp. has completed five years of experimenting with asbestos filtering compounds and is now marketing a full-floating asbestos compounded by an

entirely different process in a new type machine designed by their engineers. Full particulars are now available to the trade.

The General Electric Co. has announced a complete line of batch type nitriding furnaces for use at temperatures up to 1,200 deg. F. Included in the line are two sizes of vertical cylindrical type furnaces with a fan for circulating the ammonia gas, and two sizes of box type furnaces, complete with charging trucks for handling the retorts.

Foster Wheeler is building four refineries in Russia for the Russian government, and has under way 12 refineries in all of Europe.

Commenting on the outlook for business in this country, Mr. Brown, president of the company stated that it "has improved materially in the last 30 days, with inquiries far more active and some real business being placed."

Adjustment of certain patent restrictions now permits Fansteel Products Co., Inc., to sell pure tungsten metal in all commercial forms for general purposes. The company has manufactured tungsten since 1914, but has sold the pure metal only in the form of finished electrical contact points. However, they have produced certain tungsten-molybdenum, tungsten-tantalum and tungsten-copper alloys, as well as pure molybdenum and tantalum, and are experienced in working these metals and drawing them into fine wire.

Niacet New President

Directors of Niacet Chemicals Corp., have elected James A. Rafferty president; James W. McLaughlin an additional vice-president and J. Carlisle Swaim, secretary.

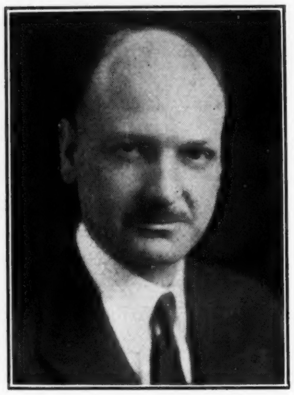
James A. Rafferty

Mr. McLaughlin's headquarters will be at 30 East 42nd Street, New York.

The Niacet Chemicals Corp.'s plant is located at Niagara Falls, New York, and the products of the company include acetic acid synthetically produced, acetaldehyde, paraldehyde, acetaldol, paraldol, crotonaldehyde and "Fastan."

Directs Swann Research

Theodore Swann, President of The Swann Corporation, has announced the appointment of Paul Logue as Chemical Director for the Swann companies. Mr. Logue has been Chief Chemist at Provident Chemical Works, the St. Louis Division of The Swann Corporation, and Vice President of Swann Research, Inc. He will be stationed at Birmingham, Alabama, the headquarters of the Corporation.



Paul Logue

In his new capacity, Mr. Logue will direct chemical control of all Swann products, supervise research work on uses for present products and have charge of technical relations with customers.

Ethylene Fumigant

Dr. Ruric C. Roark, a chemist of the Bureau of Chemistry and Soils, and Dr. Richard T. Cotton, an entomologist of the Bureau of Entomology, have just obtained a patent on ethylene oxide as a fumigant and insecticide.

Roark and Cotton are said to have applied for their patent in time to obtain the free use of ethylene oxide for the American public. The I. G. recognizing the great commercial possibilities of ethylene oxide, had already applied for a United States patent in addition to the German patent under which this gas is used abroad.

Following a hearing recently before the examiner of interferences of the United States Patent Office the prior claim of Roark and Cotton was recognized and the public service patent was granted to them.

The principal use to date for the gas as a fumigant is in the treatment of foodstuffs and related products.

George Eastman, chairman of the Eastman Kodak Co., was the guest of honor at the 32nd annual dinner of the Society of the Genesee at the Hotel Commodore, Monday, February 9 (see roto section). Mr. Eastman, who is 75, received many congratulations, including messages from President Hoover and Calvin Coolidge.

Clarence Morgan & Co. has announced that it is no longer representing the American Solvents & Chemical Corp. (Rossville Commercial Alcohol Co.) in the Illinois territory. Clarence Morgan & Co. originally represented the General Industrial Alcohol Co. previous to its absorption. It is thought as yet no definite arrangements have been made by Clarence Morgan & Co. to replace this representation.

Personnel

George L. Huisking has resigned as vice-president of the Matawan Coal Tar Products Co. He is now connected with A. D. Smack Co., importers, 28 Cliff Street, New York City. Mr. Huisking was a member of the firm of Charles L. Huisking & Co. for a number of years, previous to joining the Matawan Coal Tar Products Co.

Stockholders of Innis, Speiden & Co., at a recent meeting elected G. S. Hamilton, Assistant Treasurer, to a directorship in the company. At the same time H. G. MacKelcan, C. C. Wickstead and C. L. Speiden were elected vice-presidents.

Industrial Chemical Sales Co., Inc., has transferred Mr. E. A. Sigworth, Chief Research Chemist of their Tyrone, Pa. plant to the Sales Division in New York City, from which point he will service the Company's purification products.

T. Hamlin Briggs, who has traveled for the American Agricultural Chemical Co., for several years, has been put in charge of the sales department offices of the company in St. Paul, Minn.

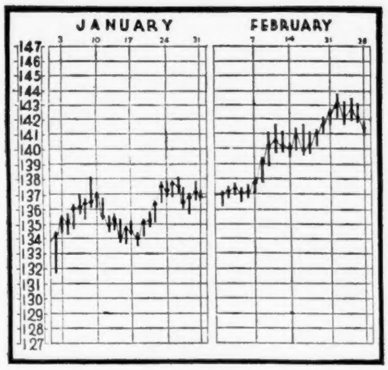
Carlton W. Bloom

Godfrey L. Cabot, Inc. has added Carlton W. Bloom to the sales department. Mr. Bloom has been for the past several years the special eastern representative of Brown & Bigelow, Minneapolis, Minnesota. Prior to that time he was associated with the Travelers Insurance Company, Hartford, Conn.

The Financial Markets

Stocks Rise Rapidly in Bull Market—Chemical Company Values Show Large Increase—International Match Stockholders Approve Stock Increase

In a market quite comparable with several of the really bullish markets of 1929 prices advanced in February to the level of October 1930 and above the low for the panic month of November two years ago. Not only were impressive gains in value made, but the volume of trading was of an enouraging nature, signifying a definite return of public con-



*Market Price Trend**

fidence in the future business trend of the country. Trading last month was the heaviest of any month since last October. Sales, as compiled by *The New York Times*, totaled 64,145,320 shares, compared with 42,543,435 shares in January and with 68,723,210 shares in February, a year ago.

The rapid advance in the market from Dec. 16 low point accounts for a recovery in prices of approximately 28 per cent in a little more than two and a half months. This is far ahead of the advance in the early months of 1930, when the upswing culminating in the second week of April registered an advance of 49 per cent for the five-month period from Nov. 3, 1929.

While such optimistic signs as increased automobile and steel production figures were assigned as reasons for the upswing, it is quite evident, that the rise was principally the natural reaction to the oversold condition of the market.

Market Trend

The market trend was steadily upward during the month with the exception of the last two or three days when profit taking and the unsettlement caused by the bonus bill brought about a turn in the steady rise and a slight loss from the high of the month. The total gain in value was the largest recorded since August, 1929 and was participated in by all groups although the oil and rubber stocks were irregular in spots.

Chemical Stocks

The leading chemical stocks did not join in the advance during the first week in the month. Instead, a slight loss was affected according to the CHEMICAL MARKETS average price of fifteen representative stocks of the industry. The second, and third weeks witnessed remarkable gains considering the mixed sentiment concerning the business outlook. In the last few days the chemical group reacted very slightly the market showing a general downward trend in stock values.

Gain in Values

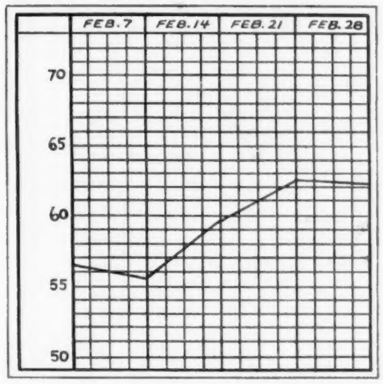
Indicative of the magnitude of the rise in stock values nine stocks thoroughly representative of the industry gained $281,680,208 in February as follows:

Allied Chemical & Dye	$31,798,556
Commercial Solvents Corp	6,009,515
Davison Chemical Co	2,961,393
Du Pont de Nemours & Co	135,554,298
Mathieson Alkali Works	2,032,450
Texas Gulf Sulphur	15,240,000
Union Carbide & Carbon	84,145,293
U. S. Industrial Alcohol	3,878,631
Virginia-Carolina Chemical	60,027
Total	$281,680,208

New Optimism

The advance in the stocks market has been a very encouraging sign and it is felt in responsible quarters that it is the forerunner of an even greater improvement in the general business situation scheduled to take place within the next few months. However, an impartial analysis of the situation does indicate that business has not improved at a rate commensurate with the advance in stocks. It would seem that after all the major portion of the forward movement has been more the result of an over-sold and unduely pessimistic viewpoint held in the months of last fall rather than definite signs as yet of trade revival of a major scope.

Chemical Stock Prices



The CHEMICAL MARKETS average stock price for the close of each of the four weeks of the month stood as follows: Jan. 31, 56.1; Feb. 7, 55.8; Feb. 14, 59.4; Feb. 21, 62.5; Feb. 28, 62.3, a net gain of 11 per cent for the group. This recovery was of much greater magnitude than the increase in the market generally, indicating an even greater oversold condition in the value of chemical stocks when comparison is had with all other groups.

Individual Increases

Every one of the stocks listed below as well as the additional ones used in the "Average Price" showed substantial gains for the month, in contrast with both losses and gains in January and losses only in December. Allied Chemical showed a net gain of 13¾ points as against a net loss of 17⅜ points in January. In the petroleum field the gain was not quite so pronounced, Standard of New Jersey showing an increase of only 3⅛ points. The rather unfavorable news concerning large surplus stocks of crude prevented this group from deriving the full benefits of the bullish feeling on the Street. On the other hand, the coppers were specially strong due to the undercurrent of feeling that any further revision of the metal price would be upward. Anaconda gained 8¼ points during the month and the other copper stocks had similar strong advances.

*N. Y. Herald-Tribune

Price Trend of Chemical Company Stocks

Name	*February 7*	*February 14*	*February 21*	*February 28*	*Net Change*
Allied Chemical	157¼	165	177	171	+13¾
Air Reduction	96	99½	103	101⅝	+5⅝
Anaconda	32⅞	37⅝	39½	41¼	+ 8⅜
Columbian Carbon	92½	103⅜	106	106	+13½
Commercial Solvents	17½	18¾	20¼	19⅞	+ 2⅜
Du Pont	87⅞	93¼	98¼	99⅛	+11¼
Standard, N. J.	47½	50¾	51⅛	50⅜	+ 2⅞
Texas Gulf	50	51⅛	54	54⅞	+ 4⅞
U. S. I.	59	67½	67⅝	71½	+12½

Financial News

International Match Corp., stockholders at a special meeting, approved an increase in authorized participating preference stock to 2,500,000 shares from 1,350,000; and the issuance of $50,000,000 of ten-year 5% convertible gold debentures.

The debenture issue is to provide funds with which to purchase government bonds from the Polish government and from the German government, in both of which countries the company jointly with Swedish Match Co., is interested in the match business.

Increase in preference shares is to provide the necessary stock for conversion privilege contained in debentures. Such debentures may be converted into preference stock at the rate of 12½ shares of preference stock for each $1,000 face amount of debentures.

Royal Dutch Bonds

Royal Dutch Petroleum Co. has announced redemption of its 5 per cent bonds amounting to 28,500,000 Dutch florins, according to an announcement made in Amsterdam on February 28. The bonds were created in 1930 to retire all outstanding priority shares. The redemption price of the bonds is 102½ per cent. The reason for the bond redemption is the prevailing low interest rates, and no new issue or any new loan is contemplated, according to the announcement.

Va-Carolina Stocks

Voting trust for 7 per cent cumulative dividend prior preferred stock of the Virginia-Carolina Chemical Corp. was terminated February 28, as the trust agreement dated March 1, 1926, expired on March 1. The company has applied to the New York Stock Exchange to list 144,871 shares of the stock. The agreement provided for termination of the voting trust in five years unless outstanding stock was reduced to $10,000,000.

Company Earnings

Earnings reports according to the Wall Street Journal as compared with those for the corresponding periods a year ago, and dividend announcements as compared with the previous ones of leading companies, follow:

	Since January 1
Increased earnings	170
Decreased earnings	634
Unchanged dividends	648
Increased dividends	36
Decreased dividends	64
Omitted dividends	63

Virginia-Carolina Chemical Co. is listing on New York Stock Exchange 144,000 shares of 7% preferred stock perpetual certificates in place of the present voting trust certificates which voting trust expires March 1.

Dividends

Celluloid Corp. omitted the quarterly dividends of $1.75 each on the preferred and participating preferred stocks due at this time.

Standard Oil Co. (New Jersey) declared the usual extra dividend of 25 cents and regular quarterly dividend of 25 cents, both payable March 16 to stock of record February 16.

Du Pont Co. declared regular quarterly dividends $1 on the common, payable March 14 to stock record February 26, and $1.50 on the debenture stock, payable April 25 to stock of record April 10.

Atlantic Refining Co. omitted the usual extra dividend of 25 cents. The regular quarterly dividend of 25 cents was declared payable March 16 to stock of record February 21.

Tennessee Corp. has declared a quarterly dividend of 12½ cents, placing stock on 50 cents annual basis, against $1 previously. The dividend is payable March 16 to stock of record February 28.

Atlas Powder Co., declared a dividend of $1.00 per share on the no par value common capital stock payable in cash March 10, 1931 to stockholders of record at the close of business on February 27, 1931.

Newport Co. declared a quarterly dividend of 25 cents on the common stock and the regular quarterly dividend of 75 cents on the Class A convertible stock, both payable March 2 to stock of record February 21. The dividend on the common stock places the issue on a $1 annual basis against $2 previously.

Dividends and Dates

Company	Stock on record	Dividend	Payable
Am. Metals, pf.	Feb. 17	$1.50	Mar. 2
Atl. Ref.	Feb. 21	.25	Mar. 16
Atlas Pow.	Feb. 27	1.00	Mar. 10
Devoe & R. A-B.	Mar. 21	.30	Apr. 1
Devoe & R, 1st pf.	Mar. 21	1.75	Apr. 1
Devoe & R, 2nd pf.	Mar. 21	1.75	Apr. 1
DuPont	Feb. 26	1.00	Mar. 14
DuPont, deb.	Apr. 10	1.50	Apr. 25
Eastman K.	Mar. 5	1.25	Apr. 1
Eastman Extra	Mar. 5	.75	Apr. 1
General Asphalt	Mar. 2	.75	Mar. 16
Nat. Lead B	Apr. 17	1.50	May 1
Newport Com.	Feb. 21	.25	Mar. 2
Pennick & F.	Mar. 2	.25	Mar. 16
P & G. 5% pfd.	Feb. 24	1.25	Mar. 14
Stand. N. J.	Feb. 16	.25	Mar. 16
Stand. N. J. Extra	Feb. 16	.25	Mar. 16
Stand. N. Y.	Feb. 20	.40	Mar. 16
Tenn. Corp.	Feb. 28	1.25	Mar. 16
Texas Corp.	Mar. 6	.75	Apr. 1
Texas Gulf	Mar. 2	1.00	Mar. 16
U. S. Gypsum	Mar. 14	.40	Mar. 31
	Books Close Rights		Privilege Expires
Alum Ltd.	Dec. 15		July 2

Monsanto Chemical Works has declared the regular quarterly dividend of 31¼ cents, payable April 1 to stock of record March 10.

Vanadium-Alloys Steel Co. declared a dividend of 50 cents, payable March 31 to stock of record March 20. Previously quarterly dividend of $1 were paid.

Nichols Copper Co. has declared quarterly dividends of 25 cents each on Class A and Class B stock, payable April 1 to stocks of record March 20. Dividends place the stocks on a $1 annual basis against $1.75 previously.

Solvents Stock Dividend

Commercial Solvents Corp. has deferred action on the stock dividend of 2% usually declared at this time. The regular quarterly dividend of 25 cents in cash has been declared payable March 31 to stock of record March 10.

The following statement has been issued by directors:

"Any action regarding a stock dividend for 1931 has been deferred until the November meeting of the board of directors."

Over the Counter Prices

Company	*Bid*	*Asked*
Am. Hard Rubber	30	35
Dixon Crucible	130	140
Dry Ice	30	45
Merck, pfd	72	75
Solid Carbonic	6⅝	8⅞
Tubize Chat B	30	35
Worcester Salt	87	92

Closing prices, Saturday, February 28.

P & G Buys Portsmouth

Proctor & Gamble Co. has about completed negotiations for acquisition of the Portsmouth Cotton Oil Refining Co. The purchase will mark the first step Procter & Gamble has made to increase its sales outlet for its cottonseed cooking oil division.

Portsmouth manufactures a cooking fat refined from cottonseed oil. About 95% of its sales are in bulk to restaurants, hotels and bakeries. The acquisition will increase Procter & Gamble's sales in the bulk field by between 10% and 15%.

Charles S. Pearce, president, Colgate-Palmolive-Peet Co. has announced that the company is not buying the Cadum Soap Co. of France.

Company Reports

United Carbon Earnings Lower

United Carbon Co. reports net profit for the year 1930, amounting to $704,600.10. Inventories at the close of the year have been valued at the lower of cost or market prices, resulting in a reduction of $292,788.84, which was charged against income for the year. In addition, all surrendered leases and abandoned wells, and idle plant expenses, amounting to $272,898,95. have been charged to the year's operations. Ample provision was made for depreciation and depletion, in the amount of $1,153,490.41, this deduction being somewhat less than the allowances provided for the years 1928 and 1929. The Management has revised the method of computing depreciation, during the year, to a basis which will provide reserves for depreciation more in line with the anticipated useful life of the properties. For some time, it has been increasingly apparent that the high rates of depreciation, heretofore used, coupled with the policy of carrying developed gas properties at cost, without regard to added discovery values, have resulted in unduly conservative book values.

Dividends declared by the Directors and distributed to shareholders for the year 1930 amounted to $823,922.13, of which amount the regular 7 per cent dividend on the outstanding Preferred Stock was $136,010.88, while the balance of $687,911.25 was disbursed to the Common shareholders, equal to $1.75 per share.

Income

Net Sales		
Carbon Black	$2,358,193.97	
Natural Gas	1,044,829.64	
Gasoline, Oil and Other	138,116.42	
Total Net Sales		$3,541,140.03
Cost of Sales		
Carbon Black	$1,288,952.66	
Natural Gas	829,863.34	
Gasoline, Oil and Other	122,403.88	
Total Cost of Sales		2,241,219.88
Manufacturing Profit		$1,299,920.15

Expenses

Selling		$ 207,486.80	
Office, Administrative and Research		204,077.12	
Total Expenses			411,563.92
Operating Profit			$ 888,356.23
Other Charges			
Price Adjustment of Carbon Black Inventory	$ 292,788.84		
Interest and Discount	25,407.12		
Surrendered Leases & Abandoned Wells	110,660.61		
Non-Productive Operating Expense	162,238.34		
Cost of Operating Employees' Dwellings	61,456.98		
Sundry	6,907.06		
Total Other Charges		$ 659,458.95	
Other Income			
Profit from Sale of Properties	$ 338,906.33		
Interest and Discount	76,636.22		
Sundry	60,160.27		
Total Other Income		475,702.82	
Other Charges—Net			183,756.13
Net Profit			$ 704,600.10
Depreciation and Depletion deducted in above Cost of Sales and Expenses amounted to			$1,153,490.41

New Jersey Zinc Co., reports for year ended December 31: Net income, after depreciation, depletion, taxes and other charges, $5,013,403, equal to $2.55 a share on the outstanding stock, compared with $9,221,794, or $4.69 a share, in 1929. Three months: $873,367, or 44 cents a share, compared with $2,276,168 or $1.16 a share, in 1929.

Butte Copper and Zinc Co., reports for year ended December 31: net loss, after expenses and taxes but before depletion, $1,819, against a profit of $203,053, or 34 cents a share on the capital stock in 1929.

Mathieson 1930 Net Profits Favorable

Mathieson Alkali Works, Inc., reports for year ended December 31, 1930, net income of $2,096,007, after depreciation, depletion and federal taxes, equivalent, after dividend requirements on 7% preferred stock, to $2.96 a share on 650,436 no-par shares of common stock. This compares with $2,324,276 or $3.31 a share in 1929.

Income account for year 1930 compares as follows:

	1930	*1929*	*1928*	*1927*
Earn aft exp	$3,484,409	$3,580,930	$3,319,248	$2,962,581
Depr. & depl	1,204,209	1,026,721	912,752	840,670
Net from op	$2,280,200	$2,554,209	$2,406,496	$2,121,911
Inc credits (net)	53,198	57,905	*29,614	*47,386
Total inc	$2,333,398	$2,612,114	$2,376,882	$2,074,525
Fed. tax	237,391	287,838	285,480	241,609
Net income	$2,096,007	$2,324,276	$2,091,402	$1,832,916
Pfd divs	173,250	173,250	173,250	173,250
Com divs	1,300,762	1,135,018	882,717	588,828
Surplus	$621,995	$1,016,008	$1,035,435	$1,070,838

*Debits.

Air Reduction Co., for 1930 shows net earnings, after depreciation and other charges, including Federal taxes, of $5,250,379, equivalent to $6.32 a share on 830,435 shares of common stock outstanding. This compares with $5,972,995, or $7.75 a share on the 770,402 shares outstanding at the end of 1929. The gross operating income amounted to $19,515,133, compared with $21,801,993 in 1929.

The net profit in the fourth quarter was $1,102,176, after taxes, which is equivalent to $1.32 a share on the stock outstanding at the end of 1930. The balance sheet as of December 31 shows a substantial increase in cash on hand and in banks, the total having been $6,475,772, compared with $4,217,867 at the end of 1929. Total current assets were $18,500,596, against $14,789,262 at the end of 1929.

Westvaco Chlorine Products Corp. and subsidiaries report for year ended December 27, 1930, net profit of $720,144 after charges and federal taxes, equivalent after 7% preferred dividends to $2.51 a share on 225,155 no-par shares of common stock. This compares with $1,127,054 or $4.32 a share in year ended December 31, 1929.

Balance sheet, as of December 27, last, shows current assets of $1,298,526 and current liabilities $74,056.

In remarks attached to annual report president W. B. Thom states that physical volume of sales in 1930 was nearly as large as in 1929 but profit margin was affected by price reductions. Last year about $860,000 was spent on plant improvements and during 1931 it is expected to spend about $1,000,000 in further work on the Charleston, W. Va. plant. These expenditures should result in important operating economies.

Earnings at a Glance

Company	*Annual Dividend*	*Net Income 1930*	*Net Income 1929*	*Common Share Earnings 1930*	*Common Share Earnings 1929*
Abbott Laboratories	$2.50	$482,064	$591,013	b$3.32	b$4.91
Air Reduction Co., Inc.	3.00	5,250,379	5,972,995	6.32	b7.75
Amer. Comm. Alcohol	....	v56,381	1,395,716	....	j4.78
General Printing Ink	2.50	850,557	1,378,540	3.18	6.01
Mathieson Alkali Wks.	2.00	2,096,007	2,324,276	2.96	3.31
Monsanto Chem. Wks.	1.25	763,003	1,691,338	b1.80	b4.25
New Jersey Zinc Co.	a2.00	5,013,403	9,221,794	2.55	4.69
St. Joseph Lead Co.	2.00	4,076,460	9,730,742	2.09	4.99
Texas Gulf Sulphur	4.00	13,972,085	16,247,478	5.50	6.39
United Carbon Co.	1.00	704,600	1,314,555	1.43	2.62
U. S. Industrial Alcohol	a6.00	v1,160,789	4,720,857	....	12.63
U. S. Gypsum Co.	a1.60	5,408,685	5,102,305	4.01	3.98
Westvaco Chlorine Products	2.00	720,144	1,127,054	2.51	4.32
Equipment Companies					
Gen. Amer. Tank Car Corp.	a4.00	6,518,181	5,770,741	b8.03	b7.56

aPlus extras.
bOn shares outstanding at end of respective period.

Freeport Reports Satisfactory Profits

Freeport Texas Co. for year ended December 31, 1930, shows net income of $3,124,185 after expenses, depreciation, federal taxes, etc., equivalent to $4.28 a share on 729,844 no-par shares of stock. Net income for December, 1929, was $359,914 making net income for 13 months ended December 31, 1930, of $3,484,099 or $4.77 a share. Company has changed its fiscal year to end December 31, instead of November 30.

Consolidated income account for year ended December 31, 1930, compares as follows:

	Year end, Dec. 31, 1930	*Year end, Nov. 30, 1929*	*Year end, Nov. 30, 1928*	*Year end, Nov. 30, 1927*
Gross sales	$13,906,178	$14,778,331	$13,173,860	$13,365,630
Costs & exp	10,161,087	10,022,940	9,456,566	9,395,526
Oper prof	$3,745,091	$4,755,391	$3,717,294	$3,968,104
Other inc	162,202	135,164	118,761	281,513
Total inc	$3,907,293	$4,890,555	$3,836,055	$4,249,617
Tax reserve	332,384	611,637	369,471	325,780
Depr res	361,853	193,877	191,008	188,235
Sub losses	88,871	......	......	......
Net inc	$3,124,185	$4,085,041	$3,275,576	$3,735,602
Dividends	2,919,376	2,919,376	4,743,986	3,101,837
Surplus	$204,809	$1,165,665	*$1,468,410	$633,765

*Deficit.

Monsanto Preliminary Statement

Monsanto Chemical Works, consolidated profit, subject to audit, after taxes and all other charges, but before depreciation and research, for the year 1930 was $2,083,688.42. After charging $867,851.78 for depreciation and obsolescence and $452,833.11 for research, net was $763,003.53 or $1.7786 per share on 429,000 shares outstanding January 2, 1931. In addition to the above charges, in excess of $800,000.00 was spent on repairs and replacements, and charged directly to operations. During 1930 there were unusual inventory write-offs amounting to $200,000.00. 1929 earnings were $1,691,338.06, or $4.184 per share on 404,253 shares outstanding January 2, 1930, which is equivalent to $3.942 per share on the present 429,000 shares outstanding. The difference in the number of shares is accounted for by stock dividends paid during 1930.

On December 31, 1930, the current position was 6½ to 1, cash and marketable securities exceeding $2,000,000.00.

At the January meeting the Monsanto Board approved the 1931 construction budget of $2,200,000.00. Included is provision for the completion of the transfer of the Woburn, Massachusetts plant of the Merrimac division to Everett, Massachusetts. This transfer will be completed by fall and will give the Merrimac division the most modern and efficient heavy chemical unit in the East. The Merrimac contact sulfuric acid plant, of which the first unit is now in operation, will have a capacity of approximately 125,000 tons of 100% acid per annum. Due to new features of construction, developed by the Monsanto Engineering and Research Departments, a very low capital cost per ton of annual production has been effected, and the entire plant, including sulfur burning, will be operated with but two men per shift, contrasted with about twenty previously required for a similar capacity output.

During the year 1930, approximately $1,750,000.00 was spent in plant additions.

American Commercial Alcohol Corp. reports for year ended December 31: Net operating profits, $56,381, compared with $1,395,717 in 1929 charges to surplus by reason of raw material and inventory write downs to market value and other surplus adjustments, $553,235; current assets as of December 31, $2,696,744; current liabilities, $285,129. For three months ended December 31: Operating loss, $13,804, against gain of $427,066 in the corresponding period of 1929.

Abbott Laboratories reports for year ended December 31, 1930, net profit of $482,064 after expenses, depreciation and federal taxes, equivalent to $3.32 a share on 145,000 no-par shares of stock.

Consolidated Chemical 1930 Net Higher

Consolidated Chemical Industries, Inc., for the year ended December 31, 1930, reports net profits before depreciation and income taxes, amounting to $925,189 with final net profit of $628,694. Both volume of business done and net profits for the year 1930 are in excess of those for 1929. Net profits before deducting depreciation and income taxes of $925,189 and final net profit after these charges of $628,694 for the year ended December 31, 1930, compare with $878,401 before depreciation and taxes and $616,713 after these charges for the year ended December 31, 1929.

Final net profits for 1930 were equivalent to $3.07 per share on the 205,000 shares of class "A" stock outstanding at the close of the year as compared to $3.08 per share on the 200,000 shares of stock outstanding at the close of 1929.

During the year 1930 two major undertakings of the company were completed. In April the $750,000 plant for the processing of raw material at Buenos Aires, Argentina, was placed in production and operated at capacity during the remainder of the year. In September the $300,000 unit at San Francisco for the finishing of glue in pearl form was completed and is now operating at capacity.

Commercial Solvents Corp., reports a net profit of $2,717,000 for the year ended December 31, 1930, after depreciation, Federal taxes, inventory adjustments, etc., equivalent to $1.07 per share on 2,529,725 shares of no par stock.

This compares with a net profit of $3,667,402 during the previous year, or $1.50 per share on 2,434,091 shares outstanding at that time.

The fixed assets of the corporation (not including assets of subsidiaries), consisting of land, buildings and equipment, were written down at the year-end to the sum of $1. This necessitated a charge against surplus of $1,727,237. The asset total was thereby reduced from $13,323,000 at the close of 1929 to $10,645,000 at the end of 1930.

Equipment Companies

Link-Belt Co., Inc. and subsidiaries, report for year ended December 31, 1930, net profit of $2,310,332 after charges and federal taxes, equivalent, after 6½% preferred dividend requirements, to $2.89 a share on 709,177 no-par shares of common stock. This compares with $3,484,686 or $4.54 a common share in 1929. Sales for the year totaled $20,303,901, against $26,519,339 in previous year.

Blaw-Knox Co. and subsidiaries report for year ended December 31, 1930, net profit of $2,689,208 after depreciation and federal taxes, etc., equivalent to $2.03 a share on 1,322,395 no-par shares of capital stock. This compares with net profit in 1929, excluding $754,527 miscellaneous credits arising through excess asset value received in acquisition of subsidiaries, of $2,838,734, equal to $2.16 a share on 1,309,727 shares then outstanding.

Foreign

Montreal—Asbestos Corp., Ltd., reports for year ended December 31, 1930, net loss of $1,229,002 after interest, depreciation, development work, etc. This compares with net profit of $18,333 equal to 25 cents a share (par $100) on 74,564 shares of preferred stock in 1929.

London—Preliminary report of Courtaulds, Ltd., for year ended December 31, 1930, shows net income of £1,349,069 after depreciation, income taxes and write-down of £925,339 on company's continental industrial investments. This compares with net income of £2,091,971 after write-down of £1,651,856 on continental investments in 1929.

The Industry's Stocks

NEW YORK STOCK EXCHANGE

1931 Feb. High	1931 Feb. Low	1931 Feb. Last	1931 High	1931 Low	1930 High	1930 Low	Sales In Feb.	Sales During 1931	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1930 1929
109⅜	93¼	102¼	109⅜	92½	156⅜	87½	188,500	319,100	Air Reduction	No	830,000	$3.00	7.75
182¾	154	169½	182¾	153½	343	170¼	245,800	447,000	Allied Chem. & Dye	No	2,401,000	6.00	12.60
124	123	124	124	120¾	126¼	120¾	1,900	4,900	7% cum. pfd.	100	393,000	7.00	76.88
29¾	22⅞	26	29¾	20	10⅜	1⅝	11,200	16,300	Amer. Agric. Chem.	100	333,000		Yr. Je. '30 Nil
14½	9	12¾	14½	9	33	9	56,100	65,500	Amer. Com. Alc.	No	389,000		3.22
22⅞	17	20⅛	22⅞	16⅝	51½	7	16,300	23,100	Amer. Metal Co., Ltd.	No	1,218,000	1.00	3.23
89½	89	89	89½	80	116	80	200	600	conv. 6% cum. pfd.	100	68,000	6.00	47.53
58½	43¼	56⅜	58½	40½	79½	37½	103,845	211,845	Amer. Smelt. & Refin.	No	1,830,000	4.00	10.02
134½	130	134½	134½	129	141	131	1,500	3,000	7% cum. pfd.	100	500,000	7.00	43.66
4½	3⅜	4	4½	2½	22½	2	5,100	11,300	Amer. Solvents & Chem.	No	503,000		2.56
8¾	4½	7¾	8¾	4½	17⅞	3⅝	35,200	40,400	Amer. Zinc. Lead, & Smelt	25	200,000		0.53
39¾	29	39¾	39¾	26¾	79⅞	26¾	1,800	3,800	6% cum. pfd.	25	80,000		7.32
43¼	32⅛	42	43¼	29¾	81½	25	538,400	1,068,315	Anaconda Copper Mining	50	8,859,000	2.50	8.29
17⅞	16¼	17⅛	17⅞	15½	29¼	13⅛	17,400	26,200	Archer Dan. Midland	No	550,000	2.00	Yr. Aug. '30 1.68
23⅝	20⅛	22¼	23⅝	18	51⅜	16⅝	145,700	227,400	Atlantic Refining Co.	25	2,690,000	1.00	6.20
54	48	51½	54	45½	106	42	4,300	9,000	Atlas Powder Co.	No	265,000	4.00	7.66
99⅞	97	98⅞	99⅞	97	106	97	330	710	6% cum. pfd.	100	96,000	6.00	28.25
2	1⅛	1⅝	2	⅞	5¼	⅞	3,000	6,400	Butte & Sup. Mining	10	290,000		Nil
2	1⅝	2	2	1½	4¼	1¼	4,300	11,900	Butte Copper & Zinc	5	600,000		0.34
4⅞	3⅜	4⅜	4⅞	2¼	15⅞	2	7,300	17,900	Certain-Teed Products	No	400,000		Nil
16	14½	16	17	8¼	45⅛	6¾	139	1,739	7% cum. pfd.	100	63,000		Nil
49⅞	47	48	49⅞	47	64⅞	44	4,500	8,100	Colgate-Palmolive-Peet	No	2,000,000	2.50	4.03
111⅝	88	104½	111⅝	73½	199	65⅛	120,100	184,420	Columbian Carbon	No	499,000	5.00	7.84
21½	17⅛	19¾	21½	15⅛	38	14	475,400	725,300	Comm. Solvents	No	2,530,000	1.00	1.51
86⅝	80⅛	83⅜	86⅝	76½	111⅜	65	55,200	118,400	Corn Products	25	2,530,000	3.00	5.49
148	147¼	147¾	150	146⅞	151½	140	490	1,160	7% cum. pfd.	100	250,000	7.00	62.59
23	14¼	20½	23	13½	43⅝	10	42,900	54,200	Davison Chem. Co.	No	504,000		Yr. Je. '30 4.00
13¾	9⅞	19	13¾	4⅞	42¾	11½	4,500	7,300	Devoe & Raynolds "A"	No	160,000	1.20	4.52
103	102½	103	104	102½	114¾	99	70	130	7% cum. 1st pfd.	100	16,000	7.00	67.59
102⅞	85⅜	98½	102⅞	83¼	145¼	80½	245,300	522,600	DuPont de Nemours	20	11,014,000	4.00	6.99
121½	120½	121½	121¾	118¾	123	114½	3,400	5,900	6% cum. deb.	100	978,000	6.00	78.54
185¾	153¼	177	185¾	143⅜	255¼	142⅛	146,000	266,805	Eastman Kodak	No	2,261,000	5.00	9.57
132	129¼	132	132	128¾	134	120⅞	150	720	6% cum. pfd.	100	62,000	6.00	356.89
42	32	37¼	45⅛	24¼	55½	24½	123,800	170,000	Freeport Texas Co.	No	730,000	4.00	5.60
45⅛	32⅝	42⅞	45⅛	24¼	71⅛	22⅜	82,800	110,700	General Asphalt Co.	No	413,000	3.00	4.71
16⅛	9	14	16⅛	8⅝	38	7	82,500	94,500	Glidden Co.	No	695,000		Yr. Oct. '30 Nil
74	65	71⅝	78	65	105⅛	63½	1,190	1,830	7% cum. prior pref.	100	74,000	7.00	Yr. Oct. '30 Nil
57	52¾	57	57	52¾	85	50	600	900	Hercules Powder Co.	No	603,000	3.00	5.95
118⅞	116⅝	118¾	119	116⅝	123¾	116½	270	630	7% cum. pfd.	100	114,000	7.00	38.16
86	45	78¾	86	45	124	31	100,400	104,700	Industrial Rayon	No	200,000	4.00	7.26
5¼	3¼	4⅞	5¼	3⅛	8½	3⅜	8,300	15,100	Intern. Agric.	No	450,000		Yr. Je. '30 1.68
51¼	46½	50	51¼	45	67½	42¼	2,900	3,600	7% cum. prior pfd.	100	100,000	7.00	Yr. Je. '30 14.58
20⅛	13⅞	19	20⅛	13⅞	44⅜	12¾	958,000	1,459,700	Intern. Nickel	No	14,584,000	1.00	1.47
42	37⅜	39½	42	37¼	45¾	31	229,500	243,700	Intern. Salt	No	240,000	3.00	11.32
77⅞	59¼	72¾	77⅞	52½	148⅜	48¾	237,400	418,900	Johns-Manville Corp.	No	750,000	3.00	8.09
11	10	11	11⅞	10	25	8¾	1,200	2,600	Kellogg (Spencer)	No	598,000	0.80	2.36
55⅛	45	52⅝	55⅛	41⅜	81⅞	39	34,400	47,600	Liquid Carbonic Corp.	No	342,000	4.00	Yr. Sep. '30 5.22
16⅛	14¼	15¼	17	13	37⅜	10½	31,100	57,800	McKesson & Robbins	No	1,073,000	1.00	2.65
37¼	34⅜	37	37¼	31½	49¼	25¾	5,200	11,600	conv. 7% cum. pref.	50	428,180	3.50	9.43
25	23	25	25	19	39⅜	20	1,600	4,000	MacAndrews & Forbes	No	340,000	2.60	3.13
29	23¼	26⅞	31½	23⅛	51⅜	30¼	111,600	248,800	Mathieson Alkali	No	650,000	2.00	3.31
122¼	119	120¾	123	119	136	115	200	350	7% cum. pfd.	100	28,000	7.00	93.91
25⅛	21⅛	24¾	25⅛	20	63¾	18⅜	9,800	14,400	Monsanto Chem.	No	416,000	1.25	4.25
36⅜	25⅛	30	36⅜	19¾	39½	18⅛	45,000	87,000	National Dist. Prod.	No	252,000	2.00	1.42
130½	120½	127¼	132	118¼	189½	114	2,400	6,500	National Lead	100	310,000	5.00	25.49
140⅛	140	140	140¼	135⅝	144	135	570	990	7% cum. "A" pfd.	100	244,000	7.00	41.95
119⅞	119½	119⅞	120	118	120	116	130	1,560	6% cum. "B" pfd.	100	103,000	6.00	82.47
46½	43	46½	46½	38	85	30	600	1,700	Newport $3 cum. conv. "A"	50	33,000	3.00	29.79
46½	42¼	45½	46½	57¼	55⅜	26⅛	43,400	104,800	Penick & Ford	No	425,000	1.00	3.97
...	...	...	...	...	111¼	107	....	....	7% cum. pfd.	100	9,000	7.00	73.33
70⅜	67¼	70	70⅜	63	78⅞	52⅝	25,200	52,200	Procter & Gamble	No	6,410,000	2.40	Yr. Je. '30 3.36
11½	9½	10¼	11⅞	8¾	27¼	7⅝	51,000	95,700	Pure Oil Co.	25	3,038,000		1.52
99½	97¼	99½	101⅞	96	114¼	90½	340	2,250	8% cum. pfd.	100	130,000	8.00	22.55
41½	39	39	41½	37¾	56½	36⅞	19,700	43,600	Royal Dutch, N. Y. shs		894,000		3.35
30⅜	24½	28¾	30⅜	24⅜	57¼	19¼	73,200	90,900	St. Joseph Lead	10	1,951,000	2.00	3.82
10¼	9	9⅜	10¼	7⅜	25½	5¼	73,100	205,290	Shell Union Oil	No	13,071,000		1.26
51¾	46⅞	49½	51¾	45⅛	75	42¼	83,600	163,800	Standard Oil, Calif.	No	12,846,000	2.50	3.63
52½	46⅞	49¾	52½	46½	84⅞	43½	364,500	744,800	Standard Oil, N. J.	25	25,419,000	1.00	4.76
26	23½	25	26	22½	40⅜	19¾	122,000	289,000	Standard Oil, N. Y.	25	17,809,000	1.60	2.23
9½	8½	9	9½	8½	17	7¾	11,600	16,900	Tenn. Corporation	No	857,000	1.00	2.19
35½	31½	34	36¼	30⅛	60½	28¼	133,100	351,500	Texas Corp.	25	9,851,000	3.00	4.91
55¾	48½	55	55¾	45¾	67⅜	40¼	83,400	301,800	Texas Gulf Sulphur	No	2,540,000	4.00	6.40
72	58⅜	68	72	55½	106⅜	52½	359,100	577,500	Union Carbide & Carb.	No	9,001,000	2.60	3.94
28¾	24	26¾	28¾	18¾	84	14⅜	152,300	240,800	United Carbon Co.	No	398,000		1.94
77⅜	54	71⅜	77⅜	54	139⅜	50½	130,300	395,300	U. S. Ind. Alc. Co.	No	374,000	6.00	12.63
75¼	48¼	66⅞	75¼	45⅛	143¼	44⅜	1,632,600	2,698,000	Vanadium Corp. of Amer.	No	378,000	3.00	4.91
3¼	2½	2⅞	3¼	2	8⅞	1⅝	6,700	11,200	Virginia Caro. Chem.	No	487,000		Yr. Je. '30 Nil
17	15	16½	17	9½	34¼	9	2,900	5,700	6% cum. part. pfd.	100	213,000		Yr. Je. '30 2.63
70⅞	68	70	72	67½	82⅜	67½	2,100	3,400	7% cum. prior pfd.	100	145,000	7.00	Yr. Je. '30 11.96
28	25⅛	27¾	28	19⅞	59½	18	2,900	5,750	Westvaco Chlorine Prod.	No	225,000	2.00	4.32

NEW YORK CURB

1931 Feb. High	1931 Feb. Low	1931 Feb. Last	1931 High	1931 Low	1930 High	1930 Low	Sales In Feb.	Sales During 1931	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1930 1929
4½	4½	4½	5⅞	4⅝	13	3⅜	300	1,200	Acetol Prod. conv. "A"	No	60,000		0.42
10	5	10	10	5	34	16	1,600	2,025	Agfa Ansco Corp.	No	300,000		Nil
178	152½	163	178	140½	356	140½	12,100	19,975	Aluminum Amer.	No	1,473,000		11.18
109¼	108½	109¼	109¼	106½	111½	104	1,200	4,700	6% cum. pfd	100	1,473,000	6.00	17.19
92¾	81	...	92¾	57½	232	57½	500	1,700	Aluminum Ltd.	No	573,000		4.15
12¾	9¼	11¾	12¾	7⅝	37	6⅜	89,050	154,600	Amer. Cyanamid "B"	No	2,404,000		4.15
14½	9⅞	11¾	14½	7⅜	43⅜	7½	7,100	20,300	Anglo-Chilean Nitrate	No	1,757,000		Yr. Je. '30 Nil
4	1¼	...	4	⅝	6½	½	5,900	6,600	Assoc. Rayon Corp.	No	1,200,000		Yr. Je. '30 1.87
58½	46¾	55½	58½	32¼	60⅜	31¼	22,400	29,300	conv. 6% cum. pfd.	100	200,000	6.00	

1931 Feb. High	1931 Feb. Low	Last	1931 High	1931 Low	1930 High	1930 Low	Sales In Feb.	Sales During 1931	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1930	1929
1 7/8	1 1/2	1 3/4	1 7/8	1 1/2	5 1/4	1 5/8	7,600	11,400	Brit. Celanese Am. Rcts.	2.43	2,806,000		0.03	
59	55 1/4	59	59	49	90	48	200	375	7% cum. part. 1st pfd.	100	148,000	7.00	14.50	
73	69	...	73	68 1/4	90	70	125	655	7% cum. prior pfd.	100	115,000	7.00	25.70	
8	5 1/8	...	10	3 1/2	20	3 1/2	200	6,340	Celluloid Corp.	No	195,000		1.76	
...	...	...	...	...	103	90 1/4	....	....	7% cum. 1st part. pfd.	No	24,000	7.00	8.59	
7 1/2	7 1/2	7 1/2	9	7 1/2	13 1/4	8 3/8	100	1,400	Courtaulds, Ltd.	1£			0.34	
50 7/8	49	49	51	45	100	49	400	1,800	Dow Chemical	No	630,000	2.00	4.08	
73 3/4	66 1/8	69 1/8	75 1/2	63 3/4	166 7/8	58 1/2	33,400	58,600	Gulf Oil	25	4,525,000	1.50	9.83	
12	12	12	13	12	23	10 1/2	500	800	Heyden Chemical Corp.	10	150,000		3.08	
...	...	...	...	...	7	4	....	....	Imperial Chem. Ind.	1£			0.49	
4	4	4	...	...	16	3 1/2	200	200	Monroe Chem.	No	126,000		2.54	
54 1/2	50	54 1/2	54 1/2	47 5/8	79 1/2	45	400	2,200	Shawinigan W. & P.	No	2,178,000	2.50	2.35	
...	...	...	63	60	85	58	....	600	Sherwin-Williams Co.	25	636,000	4.00	Yr. Aug. '30 4.14	
12	6 1/8	9 1/4	12	5 1/8	34 1/2	3 5/8	11,700	13,400	Silica Gel Corp.	No	600,000			
37	34 3/8	34 1/2	38 1/2	34 3/8	59 7/8	30	126,600	221,700	Standard Oil Ind.	25	16,851,000	2.50	4.66	
30 1/4	28 3/8	29 3/4	30 3/8	28 1/8	34 1/2	27	7,600	12,900	Swift & Co.	125	6,000,000	2.00	2.18	
16	3 5/8	9 3/4	16	3 5/8	22 3/4	3	87,650	93,050	Tubize "B"	No	600,000	10.00		
									United Chemicals					
24 7/8	20 7/8	24	24 7/8	14	44	14	3,4000	9,600	$3 cum. part. pfd.	No	115,000	3.00	7.66	

CLEVELAND

92	91 3/4	91 3/4	94	91 3/4	96	91 1/2	36	586	Cleve-Cliffs Iron, $5 pfd.	No	498,000	5.00	11.42	
65	65 7/8	64	65 7/8	60 1/2	85	57 1/2	2,463	5,314	Sherwin-Williams Co.	25	636,000	4.00	Yr. Aug. '30 4.14	

CHICAGO

38 1/2	36 1/8	38	38 1/2	35	46 3/4	33 1/2	1,250	1,250	Abbott Labs.	No	145,000	2.50	4.92	
5 1/2	5	5 1/2	5 1/2	5	15	3 1/8	390	2,080	Monroe Chem.	No	126,000		2.54	
25	22 1/4	25	25	21	35	15 1/4	210	420	$3.50 cum. pref.	No	30,000	3.50	13.35	
30 1/8	28 1/2	29 7/8	30 1/2	29 1/4	33 1/4	27	16,100	35,350	Swift & Co.	125	6,000,000	2.00	2.18	

CINCINNATI

70	66 3/4	69 1/2	70	61	110	53 1/8	2,087	8,462	Procter & Gamble	No	6,410,000	2.40	Yr. Je. '30 3.36	

PHILADELPHIA

81 1/4	80	80	81 1/4	80	100	89	400	500	Pennsylvania Salt	50	150,000	5.00	Yr. Je. '30 7.97	

MONTREAL

1/4	1/4	1/4	1/2	1/4	...	...	110	835	Asbestos Corp.	No	200,000		Nil	
1	1	1	1	1	...	...	50	50	7% non-cum pfd.	100	75,000		0.24	

The Industry's Bonds

1931 Feb. High	1931 Feb. Low	Last	1931 High	1931 Low	1930 High	1930 Low	Sales In Feb.	Sales During 1931	ISSUE	Date Due	Int. %	Int. Period	Out-standing $

NEW YORK STOCK EXCHANGE

104 1/2	103 3/4	104 1/2	104 1/2	102 3/4	105 1/2	102	71	192	Amer. Agric. Chem., 1st ref. s. f. 7 1/2s.	1941	7 1/2	F. A.	7,667,000
96	92	95 1/8	99	92	100 1/2	93	31	51	Amer. Cyan. deb. 5s.	1942	5	A. O.	4,554,000
100 1/2	98 1/2	100 1/2	101 1/4	96 3/4	177	94 3/8	355	1275	Amer. I. G. Chem. conv. 5 1/2s.	1949	5 1/2	M. N.	29,933,000
103 1/8	102	103 1/8	104 1/2	102	104	101	266	627	Am. Smelt & Ref. 1st. 5s. "A"	1947	5	A. O.	36,578,000
75 5/8	72 1/2	75 5/8	75 5/8	65 1/2	98 1/2	67	81	273	Anglo-Chilean s. f. deb. 7s.	1945	7	M. N.	14,600,000
103	101 1/2	102	103	101	103	100	130	248	Atlantic Refin. deb. 5s.	1937	5	J. J.	14,000,000
103 1/2	102	103 1/2	103 1/2	102	105 1/2	100 1/4	33	103	Interlake Iron Corp. 1st 5 1/2s "A"	1945	5 1/2	M. N.	6,629,000
103 3/4	102 1/2	102 1/2	104 1/2	102 1/2	104 1/8	97 1/2	16	21	Corn Prod. Refin. 1st s. f. 5s.	1934	5	M. N.	1,822,000
61	58	60	61	40	87 1/2	38	358	1011	Lautaro Nitrate conv. 6s.	1954	6	J. J.	32,000,000
93 3/4	88 1/2	93	96	85 1/4	100 1/2	87	35	163	Pure Oil s. f. 5 1/2% notes	1937	5 1/2	F. A.	17,500,000
103	97	98	103	88	104	93 3/4	30	223	Solvay Am. Invest. 5% notes	1942	5	M. S.	15,000,000
103 7/8	102	103 3/4	105 1/2	102	104 3/4	100	375	936	Standard Oil, N. J. deb. 5s.	1946	5	F. A.	120,000,000
104	99 1/2	100 1/4	106 1/2	98 1/4	104 1/8	96 1/2	538	1190	Standard Oil, N. Y. deb. 4 1/2s.	1951	4 1/2	J. D.	50,000,000
96	91 1/4	96	99	89 1/2	102 1/2	90 1/4	16	48	Tenn. Corporation deb. 6s. "B"	1944	6	M. S.	3,308,000

NEW YORK CURB

104 3/4	103 3/4	104 1/4	104 3/4	102 3/4	104 7/8	100 1/8	155,000	382,000	Aluminum Co., s. f. deb. 5s.	1952	5	M. S.	37,115,000
100	98 1/2	100	104 1/4	97	104 1/4	96 5/8	73,000	262,000	Aluminum Ltd., 5s.	1948	5	J. J.	20,000,000
53	53	53	54 1/4	53	60	51	1,000	13,000	Amer. Solv. & Chem. 6 1/2s.	1936	6 1/2	M. S.	1,737,000
33	33	33	34	29 1/2	...	...	3,000	15,000	General Ind. Alc., 6 1/2s.	1944	6 1/2	M. N.	2,351,000
50	45	45	53	45	80	51	54,000	130,000	General Rayon 6s. "A"	1948	6	J. D.	5,085,000
103	101 3/4	102 1/2	103	100 1/2	104	90 1/4	147,000	442,000	Gulf Oil, 5s.	1937	5	J. D.	30,414,000
103 7/8	102 1/4	103 1/2	103 7/8	101	104	99	84,000	261,000	Sinking Fund deb. 5s.	1947	5	F. A.	35,000,000
100 5/8	99 7/8	100 3/8	101 3/8	99 1/4	103 1/2	95 3/4	169,000	332,000	Koppers G. & C. deb, 5s.	1947	5	J. D.	23,050,000
96	95 1/2	95 3/4	96	92 5/8	98 3/4	90 3/8	161,000	719,000	Shawinigan W. & P. 4 1/2s. "A"	1967	4 1/2	A. O.	35,000,000
96 1/4	94 1/4	96 1/4	96 1/4	94 1/2	98 3/4	90 3/4	40,000	310,000	4 1/2s., series "B"	1968	4 1/2	M. N.	16,108,000
92	90	...	92	90	107	96	38,000	43,000	Silica Gel Corp. 6 1/2s	1932	6 1/2	A. O.	1,700,000
103 1/8	102 1/2	103 1/4	103 7/8	102 1/2	103 1/2	79 1/2	62,000	154,000	Swift & Co., 5s.	1944	5	J. J.	22,916,000
103	102 1/2	103	103	101	103 1/2	100 1/2	4,000	52,000	Westvaco Chlorine Prod. 5 1/2s	1937	5 1/2	M. S.	1,992,000

ALCOHOL
AND
INDUSTRIAL CHEMICALS

THROUGH the sales organization of A. K. Hamilton, The Pennsylvania Sugar Company and the Franco-American Chemical Works are able to offer you a two-fold service on your purchases of industrial alcohol and allied chemicals.

(1) Industrial Alcohol

Pure and denatured (all formulae)

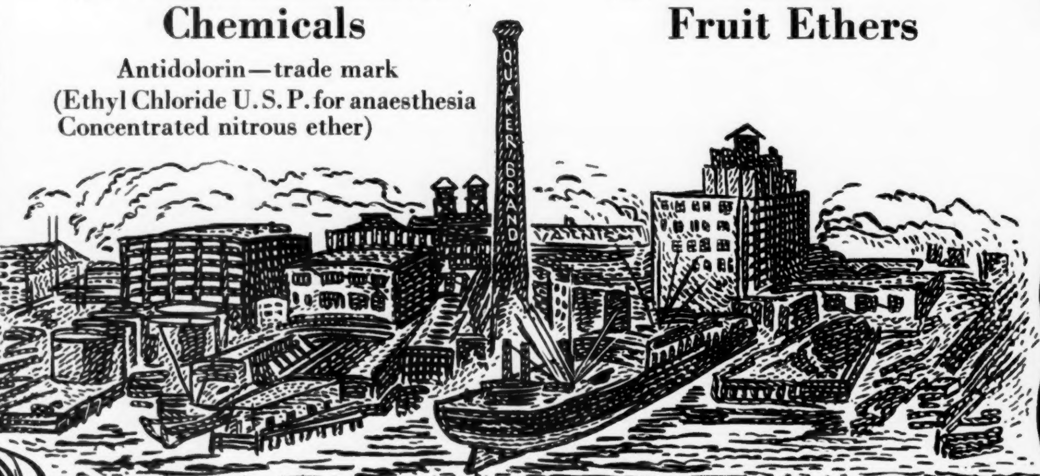
(2) Industrial Chemicals

Acetates (*Amyl, butyl, ethyl*)	Leather dopes	Gum Solutions
Butyrates	Plasticisers	Cotton Solutions
Propionates	Special Esters	Ethyl Chloride (*Refrigeration and Ethylation*)
	Fusel Oil (*Crude and Refined*)	

(3) Pharmaceutical Chemicals

Antidolorin—trade mark
(Ethyl Chloride U. S. P. for anaesthesia
Concentrated nitrous ether)

(4) Artificial Fruit Ethers



Pennsylvania Sugar Company
and
Franco-American Chemical Works

SALES OFFICE

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Sales representatives and warehouse stocks in principal cities

Distillery—Philadelphia, Pa. **Chemical Plant—Carlstadt, N. J.**

QUAKER Alcohol — FRANCO-AMERICAN STANDARDIZED CHEMICALS — QUAKER Alcohol — FRANCO-AMERICAN STANDARDIZED CHEMICALS — QUAKER Alcohol — FRANCO-AMERICAN STANDARDIZED CHEMICALS — QUAKER Alcohol — FRANCO-AMERICAN STANDARDIZED CHEMICALS — QUAKER Alcohol

The Trend of Prices

IMPORTANT PRICE CHANGES

Advances	February	January
Copper Sulfate	$4.25	$4.00
Tin Crystals	.26	.25½
Tin Tetrachloride	.19¼	.18¾
Declines		
Tri-Sodium Phosphate, bbls.	3.15	3.25
Sodium Nitrate	2.03	2.05
Lead Acetate, white (broken)	11.50	12.00
Nickel Chloride	.18	.20
Divi-divi	32.00	33.00
Ethyl Acetate, tanks	.08	.085
Japan Wax	.09½	.10½
Sodium Stannate	.23½	.26
Acid Tartaric, imported	.30	.31

Declines continued to outweigh advances in the chemical price structure during February. In the alkalies further improvement was apparent. Less carlot prices were revised and several of the larger producers announced an increase in bicarbonate. The non-ferrous metals were generally in a firmer position with the result that copper sulfate was advanced ¼c, and increases were recorded in tin salts. However, lead acetate was lowered ½c, despite a slight rise in the lead market. This decline now brings the lead salts more nearly in line with the metal price. Further weakness developed in the phosphate market and both the tri- and di-salt were lower in the face of keen competition.

The situation in solvents was apparently no better than last month. Production is still far in excess of present needs and producers were actively soliciting business at reduced prices in an effort to stimulate additional purchasing. Ethyl acetate reached 8c during the month and rumors of even better figures were quite current. One distinctly encouraging angle was the general stabilization of the coal-tar derivatives. Shipments were in good volume. Alcohol producers were marking time on prices for the second quarter. Anti-freeze consumption has suffered from the unseasonably mild weather prevailing in most sections of the country. Chemical producers, broadly speaking, are rather encouraged on the one hand with the decided betterment in tonnages, while on the other hand they are now beginning to feel the effect on profits caused by the disastrous contract season of last fall.

In the gum, fats and oils, wax and naval stores industries the problem is distinctly one of surplus stocks. Until these are eliminated from the picture there is little likelihood of further strengthening. Some improvement is noticeable, however, and consumers have shown some inclination to contracting ahead for future needs. The present situation in the shellac market has had a wholesome effect and further increases are not unlikely. Rosin and turpentine were lower as the month closed.

General Business

With two months of the year completed the concensus of opinion among business leaders, economists, and recognized interpreters of business appears to be that the bottom of the present depression was reached in the November-December period of last year and that the tide has now definitely turned in a more favorable direction. However, the recovery so far from the low levels of 1930 is of very modest proportion. As has been the case in other similar periods, certain industries have lagged behind others. It is to be expected that the next few months will continue to show conflicting reports. Certain it is that the speed of recovery would be much more rapid were it not for the general spirit of misgiving and apprehension with which the average business man looks upon the activity of the legislative branch of the federal government. The overriding of the President on the bonus bill and the passage of the Muscle Shoals legislation were unsettling factors to say the least. In the chemical industry and in the fertilizer field the proposed Muscle Shoals solution has had a very detrimental effect.

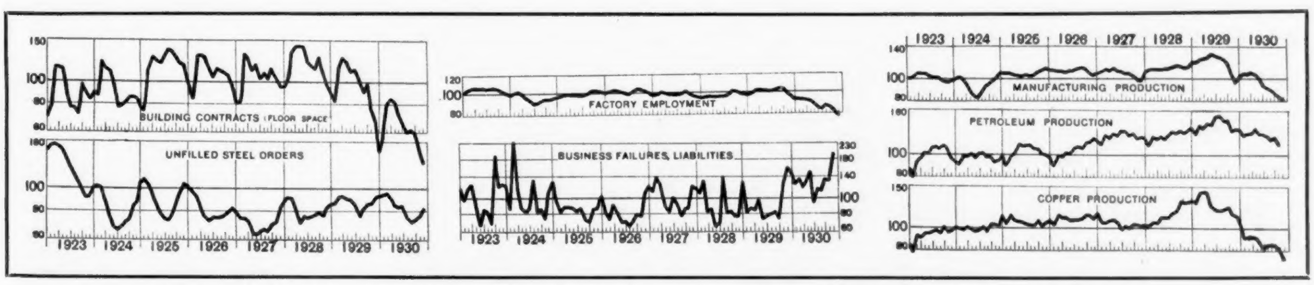
Wall Street, in the past a barometer indicating usually six months in advance a change either for better or worse, has definitely routed the bearish influences in control. The bullish tendency of the Street has had a very salutary effect and people are coming out of their shell and buying. After all, this is the first step in recovery.

Further gains were recorded in several indices of business, such as steel production, automobile factory employment, electric power output and car loadings. There were no changes of importance in the money markets.

Indices of Business

	Latest Available Month	Previous Month	Year Ago
Automobile Production, Jan	171,903	155,706	273,218
†Brokers Loans Feb	$1,720	$1,893	$3,984
*Building Contracts, Jan	$227,956	$249,935	$323,975
*Car Loadings	720	719	893
†Commercial Paper, Dec. 31	$357	$448	$334
Factory Payrolls, Jan	68.4	73.7	94.4
*Mail Order Sales, Dec	$72,486	$65,713	$90,019
Number of Failures Dun, Jan	$94,608	$83,683	$61,185
*Merchandise Imports, Jan	$183,000	$209,000	$310,987
*Merchandise Exports, Jan	$250,000	$273,000	$411,314
Furnaces in Blast % Feb. 1	32.5	30.3	54.4
*Steel Unfinished Orders, Jan. 31	4,132	3,943	4,368

*000 omitted.
†000,000 omitted.



Business indicators prepared by the Department of Commerce. The weekly average 1923-25 inclusive=100. The solid line represents 1930 and the dotted line 1929

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

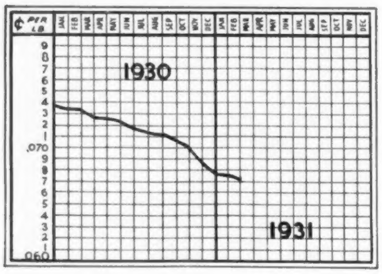
Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Feb. 1931 $1.315

The CHEMICAL MARKETS average index price of industrial chemicals, based on fifteen representative products again showed a decline in February over the preceding month, the tenth consecutive month of decline. The January figure was .0676c, while the February figure .0671c was lower due to decline of ethyl acetate,



crude sodium nitrate and tri-sodium phosphate prices. The rise in copper sulfate was not sufficient to counteract the losses in other commodities. While the decline registered in February under January was greater than that of January under December the trend in its downward direction appears to be largely checked.

Acid Anthranillic—Producers of this commodity announced on February 8, a broad increase of prices and the present market is quoted at 65c.

Acid Chromic—The competitive situation has improved considerably with the expansion of the automotive trade. Several of the larger automobile companies were replenishing stocks during the month. Prices were firm and unchanged.

Acid Citric—The market appeared to be much firmer in tone despite continued restriction in sales. The competitive situation between the domestic and imported appeared to have abated considerably. There was a radical drop in Italian outbound shipments of both citric acid and calcium citrate during the first three quarters of 1930. In this period exports of the acid totaled 3,081,000 pounds ($1,204,000) as compared with 5,495,000 pounds ($2,138,000), during first three quarters of 1929. Outgoing shipments of the citrate totaled 2,244,000 pounds ($2,964,000) in the 1930 period, contrasted with 3,905,000 pounds ($567,000) in the corresponding three quarters of 1929.

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Acetaldehyde, dr s 1c-1 wks...lb.	.18½	.21	.18½	.21	.21	.18½	.21	.18½
Acetaldol, 50 gal dr..........lb.	.27	.31	.27	.31	.31	.27	.31	.27
Acetamide.................lb.	1.20	1.35	1.20	1.35	1.35	1.20		
Acetanilid, tech, 150 lb bbl...lb.	.21	.23	.21	.23	.23	.21	.24	.21
Acetic Anhydride, 92-95%, 100 lb cbys..............lb.	.25	.28	.25	.28	.29	.25	.35	.28
Acetin, tech drums..........lb.	.30	.32	.30	.32	.32	.30	.32	.30
Acetone, tanks,.............lb.	.10	.10½	.10	.10½	.12	.11	.16	.11
Acetone Oil, bbls NY.......gal.	1.15	1.25	1.15	1.25	1.25	1.15	1.25	1.15
Acetyl Chloride, 100 lb cby...lb.	.55	.68	.55	.68	.68	.55	.68	.45
Acetylene Tetrachloride (see tetrachlorethane).............								
Acids								
Acid Acetic, 28% 400 lb bbls c-1 wks............100 lb.	.....	2.60	.....	2.60	3.88	2.60	3.88	3.88
Glacial, bbl c-1 wk.....100 lb.	.....	9.23	.....	9.23	13.68	9.23	13.68	13.68
Glacial, tanks..............	.....	8.98	.....	8.98	13.43	8.98		
Anthranilic, refd, bbls........lb.	.85	.95	.85	.95	1.00	.85	1.00	.98
Technical, bbls............lb.	.65	.70	.65	.80	.80	.75	.80	.80
Battery, cbys...........100 lb.	1.60	2.25	1.60	2.25	2.25	1.60	2.25	1.60
Benzoic, tech, 100 lb bbls....lb.	.40	.45	.40	.45	.53	.40	.60	.51
Boric, crys. powd, 250 lb. bbls..................lb.	.06¾	.07¾	.06¾	.07¾	.07¾	.06¾	.07¾	.05¾
Broenner's, bbls.............lb.	1.20	1.25	1.20	1.25	1.25	1.20	1.25	1.25
Butyric, 100% basis cbys.....lb.	.80	.85	.80	.85	.90	.80	.90	.85
Camphoric.................lb.	.....	5.25	.....	5.25	5.25	5.25	5.25	4.85
Chlorosulfonic, 1500 lb drums wks..................lb.	.04½	.05½	.04½	.05½	.05½	.04½	.05½	.04½
Chromic, 99%, drs extra.....lb.	.15	.17	.15	.17	.19	.15	.23	.17½
Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.00	1.06	1.06	1.00	1.06	1.00
Citric, USP, crystals, 230 lb. bbls..................lb.	.40	.43	.40	.43	.59	.40	.70	.46
Cleve's, 250 lb bbls..........lb.	.52	.54	.52	.54	.54	.52	.59	.52
Cresylic, 95%, dark drs NY..gal.	.47	.60	.47	.60	.70	.54	.54	.60
97-99%, pale drs NY.....gal.	.50	.60	.50	.60	.77	.58	.77	.72
Formic, tech 90%, 140 lb. cby..................lb.	.10½	.12	.10½	.12	.12	.10½	.12	.10½
Gallic, tech, bbls............lb.	.60	.70	.60	.70	.55	.50	.12	.50
USP, bbls................lb.	.....	.74	.....	.74	.74	.74	.55	.74
Gamma, 225 lb bbls wks.....lb.	.77	.80	.77	.80	.80	.77	.80	.74
H, 225 lb bbls wks..........lb.	.65	.70	.65	.70	.70	.65	.99	.80
Hydriodic, USP, 10% soln cby lb.	.....	.67	.....	.67	.67	.67	.72	.67
Hydrobromic, 48%, coml, 155							.67	
lb cbys wks............lb.	.45	.48	.45	.48	.48	.45	.48	.45
Hydrochloric, CP, see Acid Muriatic..................					.....	.....	.....	.....
Hydrocyanic, cylinders wks...lb.	.80	.90	.80	.90	.90	.80	.90	.80
Hydrofluoric, 30%, 400 lb bbls wks..................lb.	.....	.06	.....	.06	.06¼	.06	.06	.06
Hydrofluosilicic, 35%, 400 lb bbls wks.............lb.	...11	.12	.11	.12	.12	.11	.11	.11
Hypophosphorous, 30%, USP, demijohns.............lb.	.....	.85	.....	.85	.85	.85	.85	.85
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½	.04	.04½	.05	.04	.05½	.04¼
44%, light, 500 lb bbls......lb.	.11½	.12	.11½	.12	.12	.11	.12½	.11
Laurent's, 250 lb bbls........lb.	.36	.42	.36	.42	.42	.36	.42	.40
Malic, powd., kegs...........lb.	.45	.60	.45	.60	.60	.45	.60	.48
Metanilic, 250 lb bbls........lb.	.60	.65	.60	.65	.65	.60	.65	.60
Mixed Sulfuric-Nitric..........								
tanks wks..........N unit	.07	.07¼	.07	.07¼	.07¼	.07	.07¼	.07
tanks wks..........S unit	.008	.01	.008	.01	.01	.008	.01	.008
Monochloroacetic, tech bbl..lb.	.20	.30	.20	.30	.30	.18	.21	.18
Monosulfonic, bbls..........lb.	1.65	1.70	1.65	1.70	1.70	1.65	1.70	1.65
Muriatic, 18 deg, 120 lb cbys c-1 wks............100 lb.	.....	1.35	.....	1.35	1.35	1.35	1.40	1.35
tanks, wks. 100 lb.		1.00	.....	1.00	1.00	1.00	1.00	1.00
20 degrees, cbys wks...100 lb.	.....	1.45	.....	1.45	....	1.45	....	1.45
N & W, 250 lb bbls............	.85	.95	.85	.95	.95	.85	.95	.85
Naphthionic, tech, 250 lb.......	.....	Nom.	.....	Nom.	Nom.	.....	.59	.55
Nitric, 36 deg, 135 lb cbys c-wks...............100 lb.	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
40 deg, 135 lb cbys, c-1 wks...............100 lb.	.....	6.00	.....	6.00	6.00	6.00	6.00	6.00
Oxalic, 300 lb bbls wks NY...lb.	.11	.11½	.11	.11½	.11¾	.11	.11¾	.11
Phosphoric 50%, U. S. P.....lb.	.....	.14	.....	.14	.14	.14	.14	.08
Syrupy, USP, 70 lb drs....lb.	.....	.14	.....	.14	[illegible]	.14	.16	.14
Commercial, tanks,.....Unit.	.....	.80	.....	.80	.80	.80	.....	.....
Picramic, 300 lb bbls........lb.	.65	.70	.65	.70	.70	.65	.70	.65
Picric, kegs.................lb.	.30	.50	.30	.50	.50	.30	.50	.30
Pyrogallic, crystals............ ....lb.	1.50	1.60	1.50	1.60	1.60	1.30	1.40	.86
Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.33	.37	.37	.33	.42	.33
Sulfanilic, 250 lb bbls........lb.	.15	.16	.15	.16	.16	.15	.16	.15
Sulfuric, 66 deg, 180 lb cbys 1c-1 wks............100 lb.	1.60	1.95	1.60	1.95	1.95	1.60	1.95	1.60
tanks, wks. ton		15.00	.....	15.00	15.50	15.00	15.50	15.50
1500 lb dr wks......100 lb.	1.50	1.65	1.50	1.65	1.65	1.50	1.65	1.50
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.27½	1.42½	1.42½	1.27½	1.42½	1.27½
Oleum, 20%, 1500 lb. drs 1c-1 wks ....ton	.....	18.50	.....	18.50	18.50	18.50	18.50	18.50

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☛ ***Attend the Drug, Chemical and Allied Trades Dinner at Hotel Commodore, New York City, March 12.***

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Feb. 1931 $1.315

Acid Cresylic—Decided improvement was noticeable from consuming centers. Further increase in demand was confidently looked for during the next few months. Prices remained firm and unchanged during the month.

Acid Muriatic—The market continued routine throughout the month with spot sales and contract shipments somewhat better than in January.

Acid Oxalic—Spot sales were only in moderate volume, but contract customers were taking satisfactory withdrawals. No change in prices was announced.

Acid Sulfuric—Continued improvement in steel mill operation prevented any further talk of lower prices and the market appeared to be much firmer for spot or contract business.

Acid Tartaric—On February 4, importers offered material at 30c, a decrease of 1c from the former prevailing price for imported material. The keen competitive position between domestic and importers continued but no further concessions on the part of the former were forthcoming and further declines are unlikely, at least for the present.

Alcohol—Shipments in the industrial field were in much better volume and February showed a decided advance over January. However, business in No. 5 for anti-freeze purposes was slow due to the general prevalence of mild weather in most sections of the country. Producers were still marking time on second quarter prices and it is expected that these will not be announced until the second week of April.

Aluminum—Calcium, magnesium and zinc stearates were generally lowered 1c in the middle of the month.

Alums—While spot buying was in moderate quantities producers were experiencing no difficulty in obtaining published prices. The paper industry is reported as being more active and the textile trade is absorbing larger tonnages of aluminum sulfate. Further impetus to shipments is expected shortly when the buyers for water purification purposes enter the market for spring needs.

Ammonia, Aqua—A much firmer tone prevailed in the ammonia market during the past month. The textile centers in New Jersey and New England were operating at better schedules and chemical shipments into these sections showed decided improvement.

Ammonia, Anhydrous—The firm positions of the anhydrous continued. Further expansion in shipments is expected shortly.

Ammonium Sulfate—While the market was steadier than in January some unsettlement continued, specially in the

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
40%, 1c-1 wks net ....ton	.....	42.00	.....	42.00	42.00	42.00	42.00	42.00
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.40	.23	.40	.30
Tartaric, USP, gran. powd, 300 lb. bbls..............lb	.....	.31½	.....	.31½	.38½	.33	.38½	.38
Tobias, 250 lb bbls..........lb.	.....	.85	.....	.85	.85	.85	.85	.85
Trichloroacetic bottles......lb.	.....	2.75	.....	2.75	2.75	2.75	2.75	2.75
Kegs....................lb.	.....	2.00	.....	2.00	2.00	2.00	2.00	2.00
Tungstic, bbls.............lb.	1.40	1.70	1.40	1.70	1.70	1.40	2.25	1.00
Albumen, blood, 225 lb bbls..lb.	.38	.40	.38	.40	.40	.38	47	.38
dark,.............bbls., lb.	.12	.20	.12	.20	.20	.12	.20	.12
Egg, edible................lb.	.55	.56	.55	.56	.75	.55	.83	.70
Technical, 200 lb cases..lb.	.50	.55	.50	.55	.73	.50	.80	.70
Vegetable, edible..........lb.	.60	.65	.60	.65	.65	.60	.65	.60
Technical..............lb.	.50	.55	.50	.55	.55	.50	.55	.50
Alcohol								
Alcohol Butyl, Normal, 50 gal drs c-1 wks.............lb.	.16¼	.17¼	.16¼	.17¼	.18¼	.17¼	.17¾	.17¼
Drums, 1-c-1 wks........lb.	.16¾	.17¾	.16¾	.17¾	.18¾	.17¾	.18½	.17¾
Tank cars wks..........lb.	.15¾	.16¾	.15¾	.16¾	.17¾	.16¾	.17½	.16¾
Amyl (from pentane) Tanks wks............lb.	.....	.236	.....	.236	.236	.236	1.67	1.67
Diacetone, 50 gal drs del..gal.	1.42	1.60	1.42	1.60	1.60	1.42	1.80	1.42
Ethyl, USP, 190 pf, 50 gal bbls................gal.	2.63	2.75	2.63	2.75	2.75	2.63	2.75	2.69½
Anhydrous, drums........gal.	.56	.60	.56	.60	.71	.56	.71	.71
Completely denatured, No. 1, 188 pf, 50 gal drs drums extra................gal.	.40	.47	.40	.47	.51	.40	.52	.49
No. 5, 188 pf, 50 gal drs. drums extra.........gal.	.40	.44	.40	.44	50	.40	.51	.48
Tank, cars.............gal.	.37	.38	.37	.38	.48	.37	.50	.46
Isopropyl, ref, gal drs.....gal.	.60	1.00	.60	1.00	1.00	.60	1.30	1.00
Propyl Normal, 50 gal dr..gal.	.....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Alcotate, tanks.......60c a gal.	.....	.....	.....	.....	.....	.....	.....	.....
Aldehyde Ammonia, 100 gal dr lb.	.80	.82	.80	.82	.82	.80	.82	.80
Alpha-Naphthol, crude, 300 lb bbls....................lb.	.....	.73	.....	.73	.65	.60	.65	.65
Alpha-Naphthylamine, 350 lb bbls....................lb.	.32	.34	.32	.34	.34	.32	.34	.32
Alum Ammonia, lump, 400 lb bbls, 1c-1 wks.......100 lb.	3.20	3.50	3.20	3.50	3.50	3.20	3.50	3.25
Chrome, 500 lb casks, wks ....100 lb.	4.50	5.25	4.50	5.25	5.25	4.50	5.50	5.00
Potash, lump, 400 lb casks wks................100 lb.	3.10	3.50	3.10	3.50	3.50	3.10	3.50	3.00
Soda, ground, 400 lb bbls wks................100 lb.	3.50	3.75	3.50	3.75	3.75	3.50	3.75	3.75
Aluminum Metal, c-1 NY.100 lb.	22.90	24.30	22.90	24.30	24.30	24.30	24.30	24.30
Chloride Anhydrous,......lb.	.05	.09	.05	.09	.15	.05	.20	.05
Hydrate, 96%, light, 90 lb bbls....................lb.	.16	.17	.16	.17	.18	.16	.18	.17
Stearate, 100 lb bbls.......lb.	.18	.21	.18	.22	.26	.19	.26	25
Sulfate, Iron, free, bags c-1 wks..............100 lb.	1.90	1.95	1.90	1.95	2.05	1.90	2.05	1.95
Coml, bags c-1 wks..100 lb.	1.25	1.30	1.25	1.30	1.40	1.25	1.40	1.40
Aminoazobenzene, 110 lb kegs lb.	.....	1.15	.....	1.15	1.15	1.15	1.15	1.15
Ammonium								
Ammonia anhydrous Com. tanks	.....	.05⅝	.....	.05⅝	.05⅝	.05⅝		
Ammonia, anhyd, 100 lb cyl..lb.	.15¼	.15½	.15¼	.15½	.15½	.15¼	.14½	.14
Water, 26°, 800 lb dr del...lb.	.....	.03½	.....	.03¼	.03¼	.03¼	.03½	.03¼
Ammonia, aqua 26° tanks....	.02½	.02¾	.02½	.02¾	.02¾	.02½		
Acetate...................lb.	.28	.39	.28	.39	.39	.28		
Bicarbonate, bbls., f.o.b. plant ....100 lb.	.....	5.15	.....	5.15	5.15	5.15	6.50	5.15
Bifluoride, 300 lb bbls......lb.	.21	.22	.21	.22	.22	.21	.22	.21
Carbonate, tech, 500 lb cs..lb.	.09	.12	.09	.12	.12	.09	.12	.09
Chloride, white, 100 lb. bbls wks..............100 lb.	4.45	5.15	4.45	5.15	5.15	4.45	5.15	4.45
Gray, 250 lb bbls wks....lb.	5.25	5.75	5.25	5.75	5.75	5.25	5.75	5.25
Lump, 500 lb cks spot...lb.	.11	.11½	.11	.11¼	.11½	.11	.11½	.11
Lactate, 500 lb bbls.......lb.	.15	.16	.15	.16	.16	.15	.16	.15
Nitrate, tech, casks........lb.	.06	.10	.06	.10	.10	.06	.10	.06
Persulfate, 112 lb kegs.....lb.	.26	.30	.26	.30	.30	.26	.34	.26
Phosphate, tech, powd, 325 lb bbls....................lb.	.11½	.12	.11½	.12	.13	.11½	.13	.12½
Sulfate, bulk c-1.......100 lb.	.....	1.80	1.70	1.80	2.10	1.75	2.40	2.05
Southern points.....100 lb.	.....	1.88	1.70	1.75	2.10	1.82½	2.45	2.05
Nitrate, 26% nitrogen 31.6% ammonia imported bags c. i. f.........ton	34.60	35.00	34.60	35.00	57.60	45.00	60.85	52.40
Sulfocyanide, kegs........lb.	.36	.48	.36	.48	.48	.36	.48	.36
Amyl Acetate, (from pentane) Tanks................lb.	.....	.222	.....	.222	.236	.222	1.70	1.60
Tech., drs................lb.	.225	.236	.225	.236	.24	.225	.24	.23
Alcohol, see Fusel Oil........								
Furoate, 1 lb tins.........lb.		5.00	.....	5.00	5.00	5.00		
Aniline Oil, 960 lb drs........lb.	.14½	.16	.14½	.16	.16	.15	.16½	.15
Annatto, fine..............lb.	.34	.37	.34	.37	.37	.34	.37	.34
Anthraquinone, sublimed, 125 lb bbls....................lb.	.50	.55	.50	.55	.90	.50	.90	.80
Antimony, metal slabs, ton lots ....lb.	.07	.07⅛	.07	.07⅛	.09¼	.06½	.10	.08⅝
Needle, powd, 100 lb cs....lb.	.08½	.09	.08½	.09	.09½	.08	.10	.09
Chloride, soln (butter of) cbys....................lb.	.13	.17	.13	.17	.17	.13	.18	.13
Oxide, 500 lb bbls.........lb.	.08½	.08¾	.08½	.08¾	.08¾	.07½	.10	.08⅝
Salt, 66%, tins............lb.	.22	.24	.22	.24	.24	.22	.26	.24
Sulfuret, golden, bbls......lb.	.16	.20	.16	.20	.20	.16	.20	.16
Vermilion, bbls............lb.	.38	.42	.38	.42	.42	.38	.42	.38
Archil, conc, 600 lb bbls......lb.	.17	.19	.17	.19	.19	.17	.19	.17
Double, 600 lb bbls.........lb.	.12	.14	.12	.14	.14	.12	.14	.12
Triple, 600 lb bbls.........lb.	.12	.14	.12	.14	.14	.12	.16	.12
Argols, 80%, casks..........lb.	.....	.18¾	.....	.18¾	.18¾	.18¾	.18¾	.18¾
Crude, 30%, casks........lb.	.07¾	.08	.07¾	.08	.08	.07¾	.08	.08

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Feb. 1931 $1.315

northern sections. Quotations remained unchanged, however, at $35-36 a ton ex vessel according to quantity.

Dried Blood—After several declines the market for this fertilizer commodity finally stabilized at $2.75 per unit ton imports for 1930 amounted to 11,333 tons, sixteen per cent larger than 1929. Japan, the leading world importer of ammonium sulfate, imported 336,000 short tons of the commodity during 1930, a decrease of 19 per cent in volume from the 1929 imports.

Arabic—Buying from hand to mouth continued to operate in the market for this commodity. It was quite apparent that with stocks on hand as large as they are that little change in the price level can be hoped for until the surplus is exhausted.

Imports of gum arabic during the first eleven months of 1929 and 1930, respectively, were: 8,461,152 pounds, valued at $910,893, and 6,545,149 pounds valued at $933,836. Crude balsam imports declined during the 11-month period of 1929 and 1930, respectively, from 374, 641 pounds, valued at $212,302, to 362, 665 pounds, valued at $184,536.

Benzoin—Further weakness developed in Benzoin (Sumatra) and a reduction of 1c was made by leading importers, the new price being 34c in appreciable quantities.

Benzol—Demand from the automobile centers featured the market during the month and shipments were in fairly large size tonnage.

Bleaching Powder—The spot market was quite active as the month closed. Total shipments for February were better than anticipated. Prices remained firm and unchanged.

Calcium Acetate—Important factors reported the situation as unchanged from the previous month. There is very little likelihood of any further published reduction in the $2.00 figure as both producers and consumers are pretty well convinced that the bottom of the market has been reached. However, a very unusual surplus is still in evidence and until this is worked off no improvement can hope to be sustained. Production and shipments of acetate of lime and methanol fell sharply below 1929 last year, according to figures released by the Census Bureau.

Production of acetate of lime amounted to 92,363,000 pounds for the year, compared with 132,899,000 pounds during 1929. December output was 8,372,000 pounds, against 7,479,000 pounds during November and 10,939,000 pounds in December, 1929. Shipments totaled 76,874,000 pounds for the year, against 126,887,000 pounds during 1929; for December,

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Aroclors, wks.............lb.	.20	.40	.20	.40	.40	.20	.....	.....
Arsenic, Red. 224 lb kegs, cs..lb.	.09¾	.10	.09¾	.10	.11	.08¾	.11	.09
White, 112 lb kegs........lb.	.03¾	.04½	.03¾	.04½	.04½	.03¾	.04½	.04
Asbestine, c-1 wks..........ton	.....	15.00	.....	15.00	15.00	15.00	15.00	4.75
Barium								
Barium Carbonate, 200 lb bags wks..................ton	58.00	60.00	58.00	60.00	60.00	58.00	60.00	57.00
Chlorate, 112 lb kegs NY..lb.	.14	.15	.14	.15	.15	.14	.15	.14
Chloride, 600 lb bbl wks...ton	63.00	69.00	63.00	69.00	69.00	63.00	69.00	63.00
Dioxide, 88%, 690 lb drs...lb.	.12	.13	.12	.13	.13	.12	.13	.12
Hydrate, 500 lb bbls.......lb.	.04¾	.05½	.04¾	.05½	.05½	.04¾	.05½	.04¾
Nitrate, 700 lb casks.......lb.	.07½	.08¼	.07½	.08¼	.08¼	.07½	.08½	.08
Barytes, Floated, 350 lb bbls wks..................ton	23.00	24.00	23.00	24.00	24.00	23.00	24.00	23.00
Bauxite, bulk, mines........ton	5.00	8.00	5.00	8.00	8.00	5.00	8.00	5.00
Beeswax, Yellow, crude bags..lb.	.24	.31	.24	.31	.34	.24	.37	.34
Refined, cases...........lb.	.....	.37	.....	.37	.38	.37	.42	.39
White, cases..............lb.	.34	.36	.34	.36	.53	.34	.53	.51
Benzaldehyde, technical, 945 lb drums wks.............lb.	.60	.65	.60	.65	.65	.60	.65	.60
Benzene								
Benzene, 90%, Industrial, 8000 gal tanks wks..........gal.	.....	.21	.....	.21	.22	.21	.23	.23
Ind. Pure, tanks works....gal.	.....	.21	.....	.21	.22	.21	.23	.23
Benzidine Base, dry, 250 lb bbls..................lb.	.65	.67	.65	.67	.74	.65	.74	.70
Benzoyl, Chloride, 500 lb drs.lb.	.45	.47	.45	.47	1.00	.45	1.00	1.00
Benzyl, Chloride, tech drs....lb.	.....	.25	.....	.25	.25	.25	.25	.25
Beta-Naphthol, 250 lb bbl wk.lb.	.22	.24	.22	.24	.24	.22	.26	.22
Naphthylamine, sublimed, 200 lb bbls.................lb.	1.25	1.35	1.25	1.35	1.35	1.25	1.35	1.35
Tech, 200 lb bbls..........lb.	.58	.65	.58	.65	.65	.53	.68	.60
Blanc Fixe, 400 lb bbls wks..ton	75.00	90.00	75.00	90.00	90.00	75.00	90.00	75.00
Bleaching Powder								
Bleaching Powder, 300 lb drs c-1 wks contract.......100 lb.	2.00	2.35	2.00	2.35	2.35	2.00	2.25	2.00
Blood, Dried, fob, NY......Unit	2.70	3.00	2.70	3.00	3.90	3.00	4.60	3.90
Chicago...............Unit	.....	2.75	.....	2.75	4.50	2.75	5.00	4.40
S. American shipt.......Unit	3.15	3.20	3.15	3.20	4.10	3.15	4.70	4.25
Blues, Bronze Chinese Milori Prussian Soluble........lb.	.....	.35	.....	.35	.35	.35	.35	.32
Bone, raw, Chicago.........ton	31.00	32.00	31.00	32.00	39.00	31.00	42.00	39.00
Bone, Ash, 100 lb kegs.......lb.	.06	.07	.06	.07	.07	.06	.07	.06
Black, 200 lb bbls.........lb.	.05½	.08¼	.05½	.08¼	.08¼	.05½	.08½	.08½
Meal, 3% & 50%, Imp....ton	.....	31.00	.....	31.00	31.00	31.00	35.00	30.00
Borax, bags...............lb.	.02½	.03½	.02½	.03½	.03½	02½	.03½	.02½
Bordeaux, Mixture, 16% pwd..lb.	.11½	.13	.11½	.13	.14	.12	.14	.10½
Paste, bbls...............lb.	.11½	.13	.11½	.13	.14	.12	.14	.10
Brazilwood, sticks, shpmt....lb.	26.00	28.00	26.00	28.00	28.00	26.00	28.00	26.00
Bromine, cases.............lb.	.38	.45	.38	.45	.47	.38		
Bronze, Aluminum, powd blk.lb.	.60	1.20	.60	1.20	1.20	.60	1.20	.60
Gold bulk................lb.	.55	1.25	.55	1.25	1.25	.55	1.25	.55
Butyl, Acetate, normal drs..lb.	.17	.175	.17	.175	.20	.17	.195	.184
Tank, wks................lb.	.16	.175	.16	.175	.186	.16	.186	.181
Aldehyde, 50 gal drs wks...lb.	.34	.44	.34	.44	.44	.34	.70	.34
Carbitol s ee Diethylene Glycol Mono (Butyl Ether)........	.....	.....	.....	.....	.....	.....	.....	.....
Cellosolve (see Ethylene glycol mono b utyl ether)..........								
Furoate, tech., 50 gal. dr., lb.	.....	.50	.....	.50	.50	.50	.50	.50
Propionate, drs...........lb.	.22	.25	.22	.25	.27	.22	.36	.25
Stearate, 50 gal drs........lb.	.25	.30	.25	.30	.30	.25	.60	.25
Tartrate, drs.............lb.	.55	.60	.55	.60	.60	.55	.60	.57
Cadmium, Sulfide, boxes.....lb.	.90	1.40	.90	1.40	1.75	.90	1.75	.75
Calcium								
Calcium, Acetate, 150 lb bags c-1................100 lb.	.....	2.00	.....	2.00	4.50	2.00	4.50	4.50
Arsenate, 100 lb bbls c-1 wks..................lb.	.07	.09	.07	.09	.09	.07	.09	.07
Carbide, drs..............lb.	.05	.06	.05	.06	.06	.05	.06	.05
Carbonate, tech, 100 lb bags c-1..................lb.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-1 wks................ton	.....	22.75	.....	22.75	22.75	22.75	25.00	22.75
Solid, 650 lb drs c-1 fob wks ....ton	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Nitrate, 100 lb bags.......ton	40.00	43.00	40.00	43.00	43.00	40.00	52.00	42.00
Peroxide, 100 lb. drs.......lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25
Phosphate, tech, 450 lb bbls lb.	.08	.08¾	.08	.08¾	.08¾	.08	.08	.07
Stearate, 100 lb bbls.......lb.	.18	.22	.18	.22	.26	.19	.26	.25
Calurea, bags S. points. c.i.f. ton	.....	88.65	.....	88.65	88.65	88.65	88.15	82.15
Camwood, Bark, ground bbls..lb.	.....	.18	.....	.18	.18	.18	.18	.18
Candelilla Wax, bags........lb.	.14½	.15	.14½	.15	.20	.15	.24	.22
Carbitol, (See Diethylene Gycol Mono Ethyl Ether).......	.....	.....	.....	.....	.....	.....	.....	.....
Carbon, Decolorizing, 40 lb bags c-1..................lb.	.08	.15	.08	.15	.15	.08	.15	.08
Black, 100-300 lb cases 1c-1 NY...................lb.	.06	.12	.06	.12	.12	.06	.12	.12
Bisulfide, 500 lb drs 1c-1 NY...................lb.	.05½	.06	.05½	.06	.06	.05½	.06	.05½
Dioxide, Liq. 20-25 lb cyl...lb.	.....	.06	.....	.06	.18	.06	.06	.06
Tetrachloride, 1400 lb drs delivered..............lb.	.06¼	.07	.06¼	.07	.07	.06¼	.07½	.06¼
Carnauba Wax, Flor, bags....lb.	.26	.28	.26	.28	.37	.28	.43	.35
No. 1 Yellow, bags........lb.	.23	.24	.23	.24	.33	.25	.40	.33
No. 2 N Country, bags.....lb.	.18	.20	.18	.20	.27	.20	.32	.28
No. 2 Regular, bags.......lb.	.21	.23	.21	.23	.30	.23	.36	.31
No. 3 N. C...............lb.	.14½	.15	.14½	.15	.23	.16	.25	.24
No. 3 Chalky.............lb.	.14	.15	.14	.15	.23	.16	.26	.24
Casein, Standard, Domestic.... ground..................lb.	.08¾	.12	.08¾	.12	.15½	.09½	.17	.15

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Feb. 1931 $1.315

8,481,000, against 6,585,000 for the same month in 1929. Stocks of acetate of lime on hand at the close of 1930 amounted to 22,438,000 pounds, compared with 23,546,000 at the close of November and with 6,948,000 at the end of December, 1929.

Calcium Arsenate—Insecticide manufacturers were well pleased with the number and size of the inquiries now coming in from the agricultural sections. A steady tone prevailed in prices for most of the agricultural chemicals. Copper carbonate was particularly firm, due to the upward swing in the metallic copper markets. Actual sales of large tonnages are expected to be consummated during the last two weeks in March.

Carbon Black—The highly competitive situation continues to control the present market. Leading producers in the industry reduced the price of the product as of February 1 to 3c, compared with 3½c a pound previously. On December 26, last, the price was cut from 4c a pound to 3½c. It is estimated that world inventories of carbon black at the present time approximate 250,000,000 pounds, or twice as much as a year ago at this time. Present production continues at a rate in excess of consumption.

Carnauba Wax—Business continues dull in the wax markets, sales still being largely restricted to replacements. Most buyers were unwilling to contract ahead for any length of time. However, importers in the local market were holding to quoted prices for the first time in several months and despite sales of small volume the market appeared to have a much firmer tone. According to figures just released by the Department of Commerce, in the eight months ended August 31, 1930, beeswax exports from Cuba to the United States aggregated over 54,000 pounds, as compared with 50,200 pounds for the similar period of 1929. Prices in the 1930 period were decidedly lower, averaging a little less than 30c a pound in 1930, compared with 36c in the previous year.

Casein—Some improvement in demand from certain quarters was in evidence but the price situation has shown little tendency to strengthen. Leading factors are looking forward to the insecticide season as a possible relief from excess stocks. Argentine casein exports during 1930 amounted to 30,831,000 pounds, a continuance of the drop to 36,614,000 pounds in 1929, as compared with the 1928 figures of 38,788,000 pounds.

Chlorine—Shipments were in better volume as the month closed and showed a very decided improvement over January. Less carlot spot sales were spotty, but the price situation was apparently more firmly established than has been the case

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Cellosolve (see Ethylene glycol mono ethyl ether).........								
Acetate (see Ethylene glycol mono ethyl ether acetate)..								
Celluloid, Scraps, Ivory cs....lb.	.....	.20	.....	.20	.20	.20	.30	.20
Shell, cases...............lb.	.18	.20	.18	.20	.20	.18	.20	.18
Transparent, cases........ lb.	.....	.15	.....	.15	.15	.15	.32	.15
Cellulose, Acetate, 50 lb kegs .lb.	.80	1.25	.80	1.25	1.25	.80	1.25	1.20
Chalk, dropped, 175 lb bbls...lb.	.03	.03¾	.03	.03¾	.03¾	.03	.03¾	.03
Precip, heavy, 560 lb cks...lb.	.02	.03½	.02	.03½	.03½	.02	.03½	.02
Light, 250 lb casks........lb.	.02½	.03½	.02½	.03½	.03½	.02½	.03½	.02½
Charcoal, Hardwood, lump, bulk wks....................bu.	.18	.19	.18	.19	.19	.18	.19	.18
Willow, powd, 100 lb bbl wks....................lb.	.06	.06½	.06	.06½	.06½	.06	.06½	.06
Wood, powd, 100 lb bbls...lb.	.04	.05	.04	.05	.05	04	.05	.04
Chestnut, clarified bbls wks,..lb.	.02½	.03	.02½	.03	.03	.02½	.02	.03½
25% tks wks.............lb.	.01¾	.02½	.01¾	.02½	.02½	.01¾	.02½	.01½
Powd, 60%, 100 lb bgs wks.lb.	.....	.04½	.....	.04½	.04½	.04½	.04 4/5	.04½
Powd, decolorized bgs wks..lb.	.05½	.06	.05½	.06	.06	.05½	.06	.05½
China Clay, lump, blk mines.ton	8.00	9.00	8.00	9.00	9.00	8.00	9.00	8.00
Powdered, bbls...........lb.	.01¾	.02	.01¾	.02	.02	.01¾	.02	.01¾
Pulverized, bbls wks......ton	10.00	12.00	10.00	12.00	12.00	10.00	12.00	10.00
Imported, lump, bulk.....ton	15.00	25.00	15.00	25.00	25.00	15.00	25.00	15.00
Powdered, bbls...........lb.	.01¾	.03	.01¾	.03	.03	.01¾	.03½	.01¾
Chlorine								
Chlorine, cyls 1c-1 wks contract ....lb.	.07	.08½	.07	.08½	.08½	.07	.08½	.07
cyls, cl wks,. contract ...lb.	.04	.04½	.04	.04½	.04½	.04	.04½	.04¼
Liq tank or multi-car lot cyls wks contract............lb.	.01¾	.02½	.01¾	.02½	.025	.01¾	.03	.025
Chlorobenzene, Mono, 100 lb. drs 1c-1 wks............lb.	.10	.10½	.10	.10½	.10½	.10	.10½	.08½
Chloroform, tech, 1000 lb drs..lb.	.15	.16	.15	.16	.16	.15	.20	.16
Chloropicrin, comml cyls.....lb.	1.00	1.35	1.00	1.35	1.35	1.00	1.35	1.00
Chrome, Green, CP..........lb.	.26	.29	.26	.29	.29	.26	.29	.26
Commercial...............lb.	.06½	.11	.06½	.11	.11	.06½	.11	.06½
Yellow...................lb.	.16	.18	.16	.18	.18	.16	.18	.15
Chromium, Acetate, 8% Chrome bbls..................lb.	.04¾	.05¾	.04¾	.05¾	.05¾	.04¾	.05¾	.04¾
20° soln, 400 lb bbls.....lb.	.....	.05½	.....	.05½	.05½	.05½	.05½	.05½
Fluoride, powd, 400 lb bbl..lb.	.27	.28	.27	.28	.28	.27	.28	.27
Oxide, green, bbls.........lb.	.34½	.35½	.34½	.35½	.35½	.34½	.35½	.34½
Coal tar, bbls..............bbl	10.00	10.50	10.00	10.50	10.50	10.00	10.50	10.00
Cobalt Oxide, black, bags....lb.	2.10	2.22	2.10	2.22	2.22	2.10	2.22	2.10
Cochineal, gray or black bag..lb.	.52	.57	.52	.57	1.01	.52	1.01	.95
Teneriffe silver, bags.......lb.	.53	.54	.53	.54	.95	.54	.95	.95
Copper								
Copper, metal, electrol....100 lb.	10.25	10.36	9.75	10.36	17.78	9.50	24.00	17.00
Carbonate, 400 lb bbls.....lb.	.08½	.16½	.08½	.16½	.21½	.08½	.25	.13
Chloride, 250 lb bbls.......lb.	.22	.25	.22	.25	.28	.22	.28	.25
Cyanide, 100 lb drs........lb.	.41	.42	.41	.42	.45	.41	.60	.44
Oxide, red, 100 lb bbls.....lb.	.15½	.18	.15½	.18	.32	.15½	.32	.16½
Sub-acetate verdigris, 400 lb bbls...................lb.	.18	.19	.18	.19	.19	.18	.19	.18
Sulfate, bbls c-1 wks...100 lb.	4.25	4.95	4.00	4.95	5.50	3.95	7.00	5.50
Copperas, crys and sugar bulk c-1 wks................ton	13.00	14.00	13.00	14.00	14.00	13.00	14.00	13.00
Cotton, Soluble, wet, 100 lb bbls....................lb.	.40	.42	.40	.42	.42	.40	.42	.40
Cottonseed, S. E. bulk c-1...ton	.....	26.50	.....	26.50	.....	.....	.....	.....
Meal S. E. bulk..........ton	.....	.....	.....	.....	.....	.....	.....	.....
7% Amm., bags mills...ton	37.50	38.00	37.50	38.00	38.00	37.50	38.00	37.50
Cream Tartar, USP, 300 lb. bbls...................lb.	.24	.24½	.24	.24½	.27	.24¼	.28	26¼
Creosote, USP, 42 lb cbys....lb.	.40	.42	.40	.42	.42	.40	.42	.40¼
Oil, Grade 1 tanks.......gal.	.13	.14	.13	.14	.16	.15	.19	.15
Grade 2...............gal.	.11	.12	.11	.12	.14	.13	.23	.13
Grade 3...............gal.	.11	.12	.11	.12	.14	.13	.28	.13
Cresol, USP, drums..........lb.	.13	.17	.13	.17	.17	.14	.17	.14
Crotonaldehyde, 50 gal dr....lb.	.32	.36	.32	.36	.36	.32	.36	.32
Cudbear, English............lb.	.16	.17	.16	.17	.17	.16	.17	.16
Cutch, Rangoon, 100 lb bales..lb.	.11	.13	.11	.13	.13	.11	.16	.12½
Borneo, Solid, 100 lb bale..lb.	.06½	08½	.06½	.08½	.08½	.06½	.08½	.08
Cyanamide, bulk c-1 wks Nitrogen unit..............	.....	1.70	.....	1.70	2.00	1.70	2.00	2.00
Dextrin, corn, 140 lb bags.100 lb.	4.00	4.02	4.00	4.02	4.82	4.42	4.92	4.62
White, 140 lb bags.....100 lb.	3.67	4.02	3.67	4.02	4.77	4.17	4.87	4.57
Potato, Yellow, 220 lb bgs..lb.	.08	.09	.08	.09	.09	.08	.09	.08
White, 220 lb bags 1c-1....lb.	.08	.09	.08	.09	.09	.08	.09	.08
Tapioca, 200 lb bags 1c-1...lb.	.08¼	.08¾	.08¼	.08¾	.08¼	.08	.08¼	.08
Diamylphthalate, drs wks...gal.	.....	3.80	.....	3.80	3.80	3.80	3.80	3.80
Dianisidine, barrels..........lb.	2.35	2.70	2.35	2.70	2.70	2.35	3.10	2.70
Dibutylphthalate, wks.......lb.	.24½	.28	.24½	.28	.28	.24½	.26¼	.26¼
Dibutyltartrate, 50 gal drs....lb.	.29½	.31½	.29½	.31½	.31½	.29½	.31½	.29½
Dichloroethylether, 50 gal drs lb.	.....	.06	.....	.06	.07	.05	.13	.05
Dichloromethane, drs wks....lb.	.55	.65	.55	.65	.65	.55	.65	.55
Diethylamine, 400 lb drs.....lb.	2.75	3.00	2.75	3.00	3.00	2.75	3.00	2.75
Diethylcarbonate, drs ......gal.	1.85	1.90	1.85	1.90	1.90	1.85	1.90	1.85
Diethylaniline, 850 lb drs.....lb.	.55	.60	.55	.60	.60	.55	.60	.55
Diethyleneglycol, drs.........lb.	.14	.16	.14	.16	.13	.10	.13	.10
Mono ethyl ether, drs....lb.	.....	.16	.....	.16	.16	.13	.15	.13
Mono butyl ether, drs....lb.	.24	.30	.24	.30	.30	.24	.30	.25
Diethylene oxide, 50 gal dr....lb.	.....	.50	.....	.50	.50	.50	.50	.50
Diethylorthotoluidin, drs.....lb.	.64	.67	.64	.67	.67	.64	.67	.64
Diethyl phthalate, 1000 lb drums................lb.	.24	.26	.24	.26	.26	.24	.26	.24
Diethylsulfate, technical, 50 gal drums.................lb.	.30	.35	.30	.35	.35	.30	.35	.30
Dimethylamine, 400 lb drs...lb.	.....	2.62	.....	2.62	2.62	2.62	2.62	2.62
Dimethylaniline, 340 lb drs...lb.	.26	.28	.26	.28	.28	.26	.32	.26

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Feb. 1931 $1.315

in several weeks. Some further relief from excess stocks was expected from sources purchasing for water purification.

Copperas—While it is true that the steel industry has shown an encouraging increase in operating percentage, nevertheless the increase has not been of such startling proportions as to seriously effect the present firm position of copperas and at least for several months firm prices are fully expected in the trade.

Copper—As the month wore on a better tone was in distinct evidence and prices were firmer, closing at 10¼c. Smelters of the United States in 1930 produced almost 50% of the world's output of blister copper, or 1,640,000,000 pounds against 3,539,270,000 for all countries. Of a total world decrease of 674,442,000 pounds from 1929, the smelters of this country contributed 623,282,000 pounds or over 92%. South America and Mexico reduced jointly 235,000,000 pounds, but all the other countries increased quite substantially, Canadian smelters alone increasing 43% or over 66,000,000 pounds. Due to the sensational copper developments at the Frood mine of International Nickel and the Noranda property, Canadian output last year reached a high record at 226,000,000 pounds, comparing for instance with only 71,000,000 in 1927. Classified according to smelter operations which may or may not represent the country of origin, the world production for the past two years compares as follows, in pounds:

	1930	*1929*
United States	1,640,000,000	2,263,282,000
So. America	561,108,000	785,646,000
Mexico	117,070,000	127,590,000
Canada	226,008,000	158,372,000
Japan	175,848,000	164,562,000
Australia	29,316,000	25,960,000
Germany	130,120,000	118,176,000
Other Europe	305,800,000	251,634,000
Elsewhere	354,000,000	318,500,000
Total	3,539,270,000	4,213,712,000

Copper Sulfate—In the face of an improved situation in the metallic copper market manufacturers of copper sulfate instituted an increase of ¼c and the new price in carlots in barrels is now $4.25 a cwt. While shipments for the agricultural season are still to start in sizable quantities producers were expecting a heavy demand within the next fortnight. February was one of the best months the industry has had for the corresponding periods in other recent years.

Dextrin—Further weakness occurred in the starch and dextrin markets during the month, white dextrin now being quoted at $3.67; gum, $3.97; canary $3.72.

Ethyl Acetate—Effective February 12, leading producers of this solvent were

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Dimethylsulfate, 100 lb drs...lb.	.45	.50	.45	.50	.50	.45	.50	.45
Dinitrobenzene, 400 lb bbls...lb.	.15½	.16½	.15½	.16½	.16½	.15½	.16½	.15
Dintrochlorobenzene, 400 lb bbls...lb.	.13	.15	.13	.15	.15	.13	.15	.13
Dinitronaphthalene, 350 lb bbls...lb.	.34	.37	.34	.37	.37	.34	.37	.34
Dinitrophenol, 350 lb bbls....lb.	.29	.30	.29	.30	.32	.31	.32	.31
Dinitrotoluene, 300 lb bbls...lb.	.16	.17	.16	.17	.18	.16	.19	.17
Diorthotolyguanidine, 275 lb bbls wks...lb.	.42	.46	.42	.46	.46	.42	.49	.42
Dioxan (See Diethylene Oxide)	.....	.....	.....	.....	...	.....	.....	.....
Diphenyl...lb.	.20	.40	.20	.40	.50	.20	.50	.40
Diphenylamine...lb.	.37	.38	.37	.38	.40	.38	.47	.40
Diphenylguanidine, 100 lb bbl lb.	.30	.35	.30	.35	.35	.30	.40	.30
Dip Oil, 25%, drums...lb.	.26	.30	.26	.30	.30	.26	.30	.26
Divi Divi pods, bgs shipmt..ton	31.50	35.00	31.50	35.00	46.50	35.00	57.00	46.50
Extract...lb.	.05	.05½	.05	.05½	.05½	.05	.05½	.05
Egg Yolk, 200 lb cases...lb.	.72	.75	.72	.75	.80	.72	.84	.77
Epsom Salt, tech, 300 lb bbls c-1 NY...100 lb.	1.70	1.90	1.70	1.90	1.90	1.70	1.90	1.70
Ether, USP, 600 lb. drs...lb.	.21	.28	.21	.28	.28	.21	.39	.38
Anhydrous, C.P. 300 lb. drs.lb.	.....	.40	.....	.40	.40	.40		
Ethyl Acetate, 85% Ester, ... tanks...lb.	.....	.08	.08	.088	.115	.085	.122	.108
drums...lb.	.09	.095	.09	.10	.158	.094	.129	.111
Anhydrous, tanks...lb.	.....	.119	.....	.119	.142	.119		
drums...lb.	.115	.121	.115	.121	.156	.115		
Acetoacetate, 50 gal drs...lb.	.65	.68	.65	.68	.68	.65	.68	.65
Benzylaniline, 300 lb drs...lb.	.88	.90	.88	.90	1.11	.88	1.11	1.05
Bromide, tech, drums...lb.	.50	.55	.50	.55	.55	.50	.55	.50
Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.85	1.90	1.90	1.85	1.90	1.85
Chloride, 200 lb. drums...lb.	.....	.22	.....	.22	.22	.22	.22	.22
Chlorocarbonate, cbys...lb.	.....	.30	.....	.30	.40	.30	.40	.35
Ether, Absolute, 50 gal drs..lb.	.50	.52	.50	.52	.52	.50	.52	.50
Furoate, 1 lb tins...lb.	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
Lactate, drums works...lb.	.25	.29	.25	.29	.29	.25	.35	.25
Methyl Ketone, 50 gal drs..lb.	.....	.30	.....	.30	.30	.30	.30	.30
Oxalate, drums works...lb.	.45	.55	.45	.55	.55	.45	.55	.45
Oxybutyrate, 50 gal drs wks.lb.	.....	.30½	.....	.30½	.30½	.30½	.36	.30
Ethylene Dibromide, 60 lb dr .lb.	.....	.70	.....	.70	.70	.70	.70	.79
Chlorhydrin, 40%, 10 gal cbys. chloro. cont...lb.	.75	.85	.75	.85	.85	.75	.85	.75
Dichloride, 50 gal drums...lb.	.05	.07	.05	.07	.07	.05	.10	.05
Glycol, 50 gal drs wks...lb.	.25	.28	.25	.28	.28	.25	30	.25
Mono Butyl Ether drs wks.	.25	.27	.25	.27	.27	.23	.31	.23
Mono Ethyl Ether drs wks	.17	.20	.17	.20	.20	.16	.24	.16
Mono Ethyl Ether Acetate dr. wks...	.19½	.23	.19½	.23	.23	.19	.26	.19
Mono Methyl Ether, drs.lb.	.21	.23	.21	.23	.23	.19	.23	.19
Oxide, cyl...lb.	.....	2.00	.....	2.00	2.00	2.00		
Ethylidenaniline...lb.	.45	.47½	.45	.47½	.47½	.45	.65	.45
Feldspar, bulk...ton	15.00	20.00	15.00	20.00	25.00	15.00	25.00	20.00
Powdered, bulk works...ton	15.00	21.00	15.00	21.00	21.00	15.00	21.00	15.00
Ferric Chloride, tech, crystal 475 lb bbls...lb.	.05	.07½	.05	.07½	.07½	.05	.09	.05
Fish Scrap, dried, wks...unit	4.20&10	4.25&10	4.20&10	4.25&10	4.35&10	3.90&10	4.25&10	3.65&10
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit	.....	3.50&50	.....	3.50 & 50	3.50&50	3.20&50	4.00&50	3.50&50
Fluorspar, 98%, bags...	41.00	46.00	41.00	46.00	46.00	41.00	46.00	41.00

Formaldehyde

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Formaldehyde, aniline, 100 lb. drums...lb.	.37½	.42	.37½	.42	.42	.37½	.42	.37
USP, 400 lb bbls wks...lb.	.06	.07¾	.06	.07¾	.08	.06	.10	.08½
Fossil Flour...lb.	.02½	.04	.02½	.04	.04	.02½	.04	.02½
Fullers Earth, bulk, mines..ton	15.00	20.00	15.00	20.00	20.00	15.00	20.00	15.00½
Imp. powd c-1 bags...ton	24.00	30.00	24.00	30.00	30.00	24.00	30.00	25.00
Furfural (tech.) drums, wks..lb.	.....	.10	.....	.10	.15	.10	.19½	.17
Furfuramide (tech) 100 lb dr..lb.	.....	.30	.....	.30	.30	.30	.30	.30
Furfuryl Acetate, 1 lb tins...lb.	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
Alcohol, (tech) 100 lb dr...lb.	.....	.50	.....	.50	.50	.50	.50	.50
Furoic Acid (tech) 100 lb dr...lb.	.....	.50	.....	.50	.50	.50	1.00	.50
Fusel Oil, 10% impurities...gal.	.. ..	1.35	.....	1.35	1.35	1.35	1.35	1.35
Fustic, chips...lb.	.04	.05	.04	.05	.05	.04	.05	.04
Crystals, 100 lb boxes...lb.	.20	.22	.20	.22	.22	.20	.22	.20
Liquid, 50°, 600 lb bbls...lb.	.09	10	.09	.10	.10	.09	.10	.09
Solid, 50 lb boxes...lb.	.14	.16	.14	.16	.16	.14	.16	.14
Sticks...ton	25.00	26.00	25.00	26.00	26.00	25.00	26.00	25.00
G Salt paste, 360 lb bbls...lb.	.45	.50	.45	.50	.50	.45	.52	.45
Gall Extract...lb.	.18	.20	.18	.20	.20	.18	.21	.18
Gambier, common 200 lb cs. .lb.	.06½	.07	.06½	.07	.07	.06	.07	06
25% liquid. 450 lb bbls...lb.	.08	10	.08	.10	.10	.08	.14	.08
Singapore cubes, 150 lb bg..lb.	.09½	.09	.09½	.09	.09	.08½	.09	.08½
Gelatin, tech, 100 lb cases...lb.	.45	.50	.45	.50	.50	.45	.50	.45
Glauber's Salt, tech, c-1 wks...100 lb.	1.00	1.70	1.00	1.70	1.70	1.00	1.70	.70
Glucose (grape sugar) dry 70-80° bags c-1 NY...100 lb.	3.24	3.34	3.24	3.34	3.34	3.24	3.34	3.20
Tanner's Special, 100 lb bags...100 lb.	.....	3.14	.....	3.14	3.14	3.14	3.14	3.14
Glue, medium white, bbls...lb.	.22	.24	.22	.24	.24	.20	.24	.20
Pure white, bbls...lb.	.25	.26	.25	.26	.26	.22	.26	.22
Glycerin, CP, 550 lb drs...lb.	.12½	.14½	.12½	.14½	.14½	.12½	.16	.13¾
Dynamite, 100 lb drs...lb.	.10¼	.12¼	.10½	.12¼	.12¼	.11	.12¾	.10¾
Saponification, tanks...lb.	.07¼	.07½	.07¼	.07½	.08	.07½	.08¾	.07¾
Soap Lye, tanks...lb.	.06¾	.07	.06¾	.07	.07½	.06¾	.07½	.06¾
Graphite, crude, 220 lb bgs...ton	15.00	35.00	15.00	35.00	35.00	15.00	35.00	15.00
Flake, 500 lb bbls...lb.	.06	09	.06	.09	.09	.06	.09	06

Gums

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Gum Accroides, Red, coarse and fine 140-150 lb bags...lb.	.03¾	.04½	.03¾	.04½	.04½	.03¾	.04½	.03
Powd, 150 lb bags...lb.	.06	.06½	.06	.06½	.06½	.06	.06½	.06½

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Feb. 1931 $1.315

offering concessions on contracts through to June 30. Present customers are protected at the new figures. The present schedule is now based on the following prices, Tanks, 8c; tank wagons, and carlot drums 8.5c; 5 drums or more in one shipment 9c; 1 to 4 drums inclusive 9.5c. It was reported in several quarters that on tonnage of any size that further concessions could be obtained. With production much larger than present consumption, little improvement was in sight despite the increase in demand from the lacquer industry.

Glycerin—The anticipated demand from anti-freeze sources did not materialize in the tonnage anticipated, with the result that prices generally were soft. However, the only announced reduction was in the saponification grade where a drop of ¼c brought the new level down to 7¼c. (See feature section this issue.) Exports of glycerin from the United States during 1930 aggregated 606,690 pounds, as against 1,373,605 pounds in 1929. Imports, in 1930, of crude glycerin amounted to 10,906,426 pounds, compared with 14,851,901 pounds in 1929. Imports of refined glycerin totaled 3,177,479 pounds during 1930, as contrasted with 5,493,471 pounds during 1929. The following table gives statistics of the domestic output:

	Pounds	
Grade	*1929*	*1930*
Crude, 80%	140,079,568	138,647,379
Dynamite	58,981,430	50,377,057
Chemically Pure	66,790,647	69,654,223
Total	265,851,645	258,678,659

Intermediates—There was very little in the way of change in the market for most of the intermediates, sales being limited in most instances to small quantities. Contract consumers were operating at slightly better schedules in February than in the previous month. Further gains are expected, however, as the sale of dyestuffs showed considerable improvement, buyers in the textile dyeing centers entering the market more actively than for some time past. In 1930, nearly half of the $45,500,000 worth of coal-tar dyes exported from Germany went to five markets: China, $6,500,000; British India, $5,900,000; Czechoslovakia, $3,400,000; Great Britain, $3,400,000; and the United States, $2,400,000 worth.

Japan Wax—The highly competitive position of this commodity continued to feature the wax market. Notwithstanding several price concessions buyers are reported to be entering the market only for actual immediate needs. The present price is reported as low as 9½c.

Lead—For the first time in many months the metal market experienced a

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Yellow, 150-200 lb bags....lb.	.18	.20	.18	.20	.20	.18	.20	.18
Animi (Zanzibar) bean & pea 250 lb cases..............lb.	.35	.40	.35	.40	.40	.35	.40	.35
Glassy, 250 lb cases.......lb.	.50	.55	.50	.55	.55	.50	.55	.50
Asphaltum, Barbadoes (Manjak) 200 lb bags..............lb.	.09	.12	.09	.12	.12	.09	.12	.09
Egyptian, 200 lb cases.......lb.	.15	.17	.15	.17	.17	.15	.17	.15
Gilsonite Selects, 200 lb bags ....ton	58.00	65.00	58.00	65.00	65.00	58.00	65.00	58.00
Damar Batavia standard 136, lb cases..................lb.	.12¼	.13	.12½	.13	.20	.14	.26	.22
Batavia Dust, 160 lb bags.....lb.	.05½	.06	.05½	.06	.11	.06	.11	.10½
E Seeds, 136 lb cases.......lb.	.07½	.08	.07½	.08	.13	.08	.17½	.15
F Splinters, 136 lb cases and bags..................lb.	.07	.07½	.07	.07½	.13½	.07	.13½	.13
Singapore, No 1, 224 lb cases lb.	.14½	.15	.14½	.15	.24	.18½	.30½	.26
No. 2, 224 lb cases........lb.	.09½	.10	.09½	.10	.20½	.13	.24	.21½
No. 3, 180 lb bags.........lb.	.05½	.06	.05½	.06	.11½	.07	.14	.10
Benzoin Sumatra, U. S. P. 120 lb cases..................lb.	.33	.34	.33	.34	.40	.33	.40	.38
Copal Congo, 112 lb bags, clean opaque................lb.	.16	.17	.16	.17	.17	.16	.17	.14
Dark, amber..............lb.	.07	.07¾	.07	.07½	.08	.07¾	.09	.08¾
Light, amber.............lb.	.12½	.14	.12½	.14	.14	.12½	.14	.12½
Water white..............lb.	.37	.45	.37	.45	.45	.37	.36	.35
Mastic....................lb.	.52	.58	.52	.58	.65	.57	.65	.58
Manila, 180-190 lb baskets								
Loba A...................lb.	.12	.13	.12	.13	.17½	.13	.17½	.17
Loba B...................lb.	.10	.10½	.10	.10½	.16½	.13½	.16½	.15½
Loba C...................lb.	.09½	.10	.09½	.10	.14	.10	.14½	.13½
M A Sorts..............lb.	.06	.06½	.06	.06½	.....	.....	.....	.....
D B B Chips.............lb.	.07½	.08	.07½	.08	.....	.....	.....	.....
East Indies chips, 180 lb bags lb.	.05	.05½	.05	.05½	.11	.09	.11	.10
Pale bold, 224 lb cs......lb.	.15½	.16	.15½	.16	.21	.17½	.21	.20
Pale nubs, 180 lb bags....lb,	.08½	.09	.08½	.09	.16	.12½	.16	15
Pontianak, 224 lb cases....								
Bold gen No 1.........lb.	.16	.17	.16	.17	.21	.19	.23	.20
Gen chips spot..........lb.	.08	.08½	.08	.08½	.15	.13½	.15	.14½
Elemi, No. 1, 80-85 lb cs...lb.	.11½	.12	.11½	.12	.14	.12½	.14	.13½
No. 2, 80-85 lb cases.....lb.	.11	.11½	.11	.11½	.13½	.12	.13½	.13
No. 3, 80-85 lb cases.....lb.	.10	.11	.10	.11	.13	.11	.13	.12
Kauri, 224-226 lb cases No. 1	.44	.50	.44	.50	.57	.48	.57	.50
No. 2 fair pale..........lb.	.28	.29	.28	.29	.38	.32	.38	.35
Brown Chips, 224-226 lb cases................lb.	.10	.12	.10	.12	.12	.10	.12	.10
Bush Chips, 224-226 lb. cases................lb.	.32	.34	.32	.34	.40	.38	.40	.38
Pale Chips, 224-226 lb cases ....lb.	.20	.22	.20	.22	.26	.24½	.26	.24½
Sandarac, prime quality, 200 lb bags & 300 lb casks...lb.	.19	.22	.19	.22	.40	.27	.72	.35
Helium, 1 lit. bot. ....lit.	.....	25.00	.....	25.00	25.00	25.00	.20	.17
Hematine crystals, 400 lb bbls lb.	.14	.18	.14	.18	.18	.14	.20	.14
Paste, 500 bbls............lb.	.....	.11	.....	.11	.11	.11	.11	.11
Hemlock 25%, 600 lb bbls wks lb.	.03	.03½	.03	.03½	.03½	.03	.03¾	.03
Bark.....................ton	.....	16.00	.....	16.00	16.00	16.00	17.00	16.00
Hexalene, 50 gal drs wks......lb.	.....	.60	.....	.60	.60	.60	.60	.60
Hexamethylenetetramine, drs.lb.	.46	.50	.46	.50	.50	.46	.58	.48
Hoof Meal, fob Chicago....unit	.....	2.50	.....	2.50	3.75	2.50	4.00	3.75
South Amer. to arrive....unit	.....	2.70	.....	2.70	3.75	2.70	3.90	3.75
Hydrogen Peroxide, 100 vol, 140 lb cbys..................lb.	.21	.24	.21	.24	.26	.21	.26	.24
Hydroxyamine Hydrochloride lb.	.....	3.15	.....	3.15	3.15	3.15		
Hypernic, 51°, 600 lb bbls....lb.	.12	.15	.12	.15	.15	.12	.15	.12
Indigo Madras, bbls.........lb.	1.28	1.30	1.28	1.30	1.30	1.28	1.30	1.28
20% paste, drums.........lb.	.15	.18	.15	.18	.18	.15	.18	.15
Synthetic, liquid..........lb.	.....	.12	.....	.12	.12	.12	.12	.12
Iron Chloride, see Ferric or Ferrous								
Iron Nitrate, kegs...........lb.	.09	.10	.09	.10	.10	.09	.10	.09
Coml, bbls..........100 lb.	2.50	3.25	2.50	3.25	3.25	2.50	3.25	2.50
Oxide, English..........lb.	.10	.12	.10	.12	.12	.10	.12	.10
Red, Spanish...........lb.	.02½	.03½	.02½	.03½	.03½	.02½	.03½	.02½
Isopropyl Acetate, 50 gal drs gal.	.85	.90	.85	.90	.90	.85	.90	.85
Japan Wax, 224 lb cases......lb.	.10	.10½	.10	.11	.15½	.11½	.18	.16
Kieselguhr, 95 lb bgs NY.......								
Brown.................ton	60.00	70.00	60.00	70.00	70.00	60.00	70.00	60.00
Lead Acetate, bbls wks...100 lb.	10.50	11.00	10.50	11.00	13.50	10.50	13.50	13.00
White crystals, 500 lb bbls wks..............100 lb.	11.50	12.00	11.50	12.25	14.50	11.50	14.50	14.00
Arsenate, drs 1c-1 wks.....lb.	.13	.16	.13	.16	.16	.13	.15	.13
Dithiofuroate, 100 lb dr....lb.	.....	1.00	.....	1.00	1.00	1.00		
Metal, c-1 NY........100 lb.	.....	4.60	4.25	4.60	7.75	5.10	7.75	6.10
Nitrate, 500 lb bbls wks....lb.	.13	.14	.13	.14	.14	.13	.14	.14
Oleate, bbls..............lb.	.17½	.18	.17½	.18	.18	.17½	.18	.17½
Oxide Litharge, 500 lb bbls.lb.	.07¼	.08	.07¼	.08	.08¾	.08¼	.08¾	.08½
Red, 500 lb bbls wks....lb.	.07¾	.08¼	.07¾	.08¼	.09¾	.08¾	.09¾	.09½
White, 500 lb bbls wks...lb.	.07¼	.08	.07¼	.08	.09½	.07¼	.09½	.09
Sulfate, 500 lb bbls wk...lb.	.06¾	.07	.06¾	.07	.08¾	.06¾	.08¾	.08¼
Leuna saltpetre, bags c.i.f. ..ton	.....	57.60	.....	57.60	57.60	57.60	57.00	52.00
S. points c. i. f............ton	.....	57.90	.....	57.90	57.90	57.90	57.30	52.30
Lime, ground stone bags.....ton	.....	4.50	.....	4.50	4.50	4.50	4.50	4.50
Live, 325 lb bbls wks...100 lb.	.....	1.05	.....	1.05	1.05	1.05	1.05	1.05
Lime Salts, see Calcium Salts								
Lime-Sulfur soln bbls........gal.	.15	.17	.15	.17	.17	.15	.17	.15
Lithopone, 400 lb bbls 1c-1 wks ....lb.	.04¾	.05	.04¾	.05	.05¾	.04¾	.06½	.05¾
Logwood, 51°, 600 lb bbls.....lb.	.07	.08	.07	.08	.08½	.07	.08½	.08½
Chips, 150 lb bags.........lb.	.03	.03½	.03	.03½	.03½	.03	.03½	.03
Solid, 50 lb boxes.........lb.	.12	.12½	.12	.12½	.12½	.12½	.12½	.12½
Sticks...................ton	24.00	26.00	24.00	26.00	26.00	24.00	26.00	24.00
Lower grades.............lb.	.07½	.08	.07½	.08	.08	.07½	.08	.07½
Madder, Dutch.............lb.	.22	.25	.22	.25	.25	.22	.25	.22
Magnesite, calc, 500 lb bbl...ton	50.00	60.00	50.00	60.00	60.00	50.00	60.00	50.00

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Feb. 1931 $1.315

turn in prices when on February 20, several of the leading producers announced an increase of ten points. With buying slackening as the month closed some of this gain was lost, but it was difficult to do any better than $4.60 at New York and $4.35, at East St. Louis.

Lead Acetate—The general process of reducing the metallic salts to the corresponding levels of the metals was furthered with a drop of ½c on the various grades of lead acetate. Brown is now quoted at $10.00 a cwt., and white, broken, at $11.50.

Mastic—In sympathy with several of the more important gums mastic was reduced on February 11, and the present quotations are based on 52c.

Methanol—With the use of methanol for anti-freeze purposes still very much in the controversial stage and with rather mild weather prevailing in most sections of the country the demand for this purpose has not as yet assumed important proportions. Shipments for industrial purposes were better than at the close of last year but still far from satisfactory. Refined methanol production from wood distillation during 1930 was 5,519,000 gallons compared with 6,296,000 produced during 1929. December production, 472,547 gallons, against 521,100 in November and 524,100 during December, 1929. Refined methanol shipments for 1930, 5,818,000 gallons; compared with 6,025,000 during 1929; December 462,300, against 576,000 in November, and 478,056 in December, 1929. Stocks of refined at the close of the year, 386,500 gallons, compared with 376,300 at the end of November and 785,400 at the close of 1929. Synthetic methanol production for 1930 amounted to 9,308,217 gallons; shipments, 8,569,000, and stocks at the close of the year, 1,290,000 gallon Comparative data for 1929 not available. December production was 908,824 gallons, against 1,722,000 in November, and December shipments, 390,100 gallons, against 1,297,000 in November. Crude methanol production during 1930 amounted to 5,491,500 gallons, compared with 7,927,900 gallons during 1929. December output, 512,200 gallons, against 464,100 during November, and 783,800 during December, 1929. Crude methanol stocks at plants at the close of the year totaled 322,500 gallons, against 291,587 at the end of November, and 215,200 at the close of December, 1929. At refineries and in transit at the close of the year, 93-805 gallons, against 59,197 at the end of November, and 728,400 at the end of 1929. Supplies of crude methanol underwent an unusual decline at refineries and in transit during October. The figures for that month were 79,200 gallons, against 357,100

	Current Market		1931		1930		1929	
			Low	High	High	Low	High	Low
Magnesium								
Magnesium Carb, tech, 70 lb bags NY.....lb.	.06	.06½	.06	.06½	.06½	.06	.06½	.06
Chloride flake, 375 lb. drs c-1 wks.....ton	.....	36.00	.....	36.00	36.00	36.00	36.00	36.00
Imported shipment.....ton	31.75	33.00	31.75	33.00	33.00	31.75	33.00	33.00
Fused, imp, 900 lb bbls NY ton	.....	31.00	.....	31.00	31.00	31.00	31.00	31.00
Fluosilicate, crys, 400 lb bbls wks.....lb.	.10	.10½	.10	.10½	.10½	.10	.10½	.10
Oxide, USP, light, 100 lb bbls.....lb.	.....	.42	.....	.42	.42	.42	.42	.42
Heavy, 250 lb bbls.....lb.	.....	.50	.....	.50	.50	.50	.50	.50
Peroxide, 100 lb cs.....lb.	1.00	1.25	1.00	1.25	1.25	1.00	1.25	1.00
Silicofluoride, bbls.....lb.	.09¾	.10¼	.09¾	.10¼	.10¼	.09¾	.10¼	.09¾
Stearate, bbls.....lb.	.24	.26	.24	.26	.26	.25	.26	.25
Manganese Borate, 30%, 200 lb bbls.....lb.	.....	.19	.....	.19	.19	.19	.24	.19
Chloride, 600 lb casks.....lb.	.07½	.08½	.07½	.08½	.08½	.07½	.08½	.08
Dioxide, tech (peroxide) drs lb.	.03½	.06	.03½	.06	.06	.03½	.06	.04½
Ore, Powdered or granular..								
75-80%, bbls.....lb.	.02½	.03	.02½	.03	.03	.02½	.03½	.02½
80-85%, bbls.....lb.	.....	.03½	.....	.03½	.03½	.03½	.04½	.03½
85-88%, bbls.....lb.	.04	.04½	.04	.04½	.04½	.04	.05½	.04
Sulfate, 550 lb drs NY.....lb.	.07	.08	.07	.08	.08	.07	.08½	.07
Mangrove 55%, 400 lb bbls...lb.	.03½	Nom.	.03½	Nom.	Nom.	.03½	Nom.	.03½
Bark, African.....ton	28.00	29.75	28.00	29.75	33.00	29.75	35.00	30.00
Marble Flour, bulk.....ton	14.00	15.00	14.00	15.00	15.00	14.00	15.00	14.00
Mercurous chloride.....lb.	.....	2.05	.....	2.05	2.05	2.05	2.05	2.05
Mercury metal..... 75 lb flask	102.00	106.00	102.00	106.00	124.50	106.00	126.00	120.00
Meta-nitro-aniline.....lb.	.67	.69	.67	.69	.69	.67	.74	.67
Meta-nitro-para-toluidine 200 lb. bbls.....lb.	1.50	1.55	1.50	1.55	1.55	1.50	1.55	1.50
Meta-phenylene-diamine 300 lb. bbls.....lb.	.80	.84	.80	.84	.84	.80	.90	.80
Meta-toluene-diamine, 300 lb bbls.....lb.	.67	.69	.67	.69	.69	.67	.72	.67
Methanol								
Methanol, (Wood Alcohol),....								
95%.....gal.	.35	.37	.35	.37	.48	.35	.65	.51
97%.....gal.	.39	.43	.39	.43	.49	.39	.65	.53
Pure, Synthetic drums cars gal.	.....	.42½	.....	.42½	.50	.42½	.68	.53
Synthetic tanks.....gal.	.....	.40½	.....	.40½	.50	.40½	.66	.54
Methyl Acetate, drums.....gal.	.....	Nom.	.....	Nom.	Nom.	Nom.	.95	.95
Acetone,.....gal.	.62	.70	.62	.70	.77	.65	.85	.73
Anthraquinone,.....lb.	.85	.95	.85	.95	.85	.70	.95	.85
Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	.....	.....	.....	.....	.....	.....	.....	....
Chloride, 90 lb cyl.....lb.	.45	.45	.45	.45	.45	.45	.60	.45
Furoate, tech., 50 gal. dr., .lb.	.....	.50	.....	.50	.50	.50	.50	.50
Mica, dry grd. bags wks.....lb.	65.00	80.00	65.00	80.00	80.00	65.00	80.00	65.00
Wet, ground, bags wks.....lb.	110.00	115.00	110.00	115.00	115.00	110.00	115.00	110.00
Michler's Ketone, kegs.....lb.	.....	3.00	.....	3.00	3.00	3.00	3.00	3.00
Monochlorobenzene, drums see, Chorobenzene, mono.....lb.								
Monomethylparaminosufate 100 lb drums.....lb.	3.75	4.00	3.75	4.00	4.00	3.75	4.20	3.75
Montan Wax, crude, bags.....lb.	.06	.07	.06	.07	.07	.06	.07	.06½
Myrobalans 25%, liq bbls....b	.03¾	.04¼	.03¾	.04¼	.04¼	.03¾	.04¼	.03¾
50% Solid, 50 lb boxes.....lb.	.05	.05½	.05	.05½	.05½	.05	.08½	.05
J1 bags.....ton	34.00	35.00	34.00	35.00	41.00	34.00	43.00	40.00
J 2 bags.....ton	19.00	20.00	19.00	22.50	26.50	19.75	40.00	26.50
R 2 bags.....ton	18.25	20.00	18.75	20.00	27.50	19.00	34.00	27.50
Naphtha, v. m. & p. (deodorized) bbls.....gal.	.17	.18	.17	.18	.16	.16	.18	.16
Naphthalene balls, 250 lb bbls wks.....lb.	.03¾	.04¾	.03¾	.04¾	.05½	.03¾	.05½	.05½
Crushed, chipped bgs wks..lb.	.....	.04	.....	.04	.04½	.04	.04½	.04½
Flakes, 175 lb bbls wks.....lb.	.....	.03¾	.....	.03¾	.05	.03¾	.05	.05
Nickel Chloride, bbls kegs.....lb.	.18	.20	.18	.21	.21	.20	.24	.20
Oxide, 100 lb kegs NY.....lb.	.37	.40	.37	.40	.40	.37	.40	.37
Salt bbl. 400 bbls lb NY...lb.	.10½	.13	.10½	.13	.13	.10½	.13	.13
Single, 400 lb bbls NY.....lb.	.10½	.12	.10½	.12	.13	.10½	.13	.13
Nicotine, free 40%, 8 lb tins, cases.....lb.	1.25	1.30	1.25	1.30	1.30	1.25	1.30	1.25
Sulfate, 10 lb tins.....lb.	.98½	1.20	.98½	1.20	1.20	.98½	1.20	.98½
Nitre Cake, bulk.....ton	12.00	14.00	12.00	14.00	18.00	12.00	18.00	12.00
Nitrobenzene, redistilled, 1000 lb drs wks.....lb.	.09	.09½	.09	.09½	.09½	.09	.10½	.09
Nitrocellulose, c-l-l-cl, wks...lb.	.25	.36	.25	.36	.36	.25	.36	.25
Nitrogenous Material, bulk..unit	2.40	2.50	2.40	2.70	3.40	2.50	4.00	3.40
Nitronaphthalene, 550 lb bbls.lb.	.....	.25	.....	.25	.25	.25	.25	.25
Nitrotoluene, 1000 lb drs wks.lb.	.14	.15	.14	.15	.15	.14	.15	.14
Nutgalls Aleppy, bags.....lb.	.16	.16½	.16	.16½	.16½	.16	.16½	.16
Chinese, bags.....lb.	.12	.13	.12	.13	.13	.12	.13	.12
Oak Bark, ground.....ton	30.00	35.00	30.00	35.00	35.00	30.00	50.00	30.00
Whole.....ton	20.00	23.00	20.00	23.00	23.00	20.00	23.00	20.00
Orange-Mineral, 1100 lb casks NY.....lb.	.11¾	.13	.11¾	.13	.13	.11¾	.13½	.11¾
Orthoaminophenol, 50 lb kgs..lb.	2.15	2.25	2.15	2.25	2.25	2.15	2.25	2.15
Orthoanisidine, 100 lb drs.....lb.	2.50	2.60	2.50	2.60	2.60	2.50	2.60	2.50
Orthochlorophenol, drums.....lb.	.50	.65	.50	.65	.65	.50	.65	.50
Orthocresol, drums.....lb.	.25	.25	.25	.25	.35	.18	.28	.18
Orthodichlorobenzene, 1000 lb drums.....lb.	.07	.10	.07	.10	.10	.07	.10	.07
Orthonitrochlorobenzene, 1200 lb drs wks.....lb.	.30	.33	.30	.33	.33	.30	.33	.30
Orthonitrotoluene, 1000 lb drs wk.....lb.	.16	.18	.16	.18	.18	.16	.18	.16
Orthonitrophenol, 350 lb dr...lb.	.85	.90	.85	.90	.90	.85	.90	.85
Orthotoluidine, 350 lb bbl 1c-1 lb.	.28	30	.25	.30	.30	.25	.30	.25

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Feb. 1931 $1.315

gallons during September and 903,300 at the end of January, 1930.

Nickel Chloride—The principal producers and dealers in plating supplies placed in effect on February 3, a reduction of 2c a lb. The present market in barrels is 18c. While some improvement is noticeable in the plating industry, the trend towards other finishes is exerting some influence on the consumption of nickel salts and nickel chloride.

Phenol—While spot sales were rather spotty shipments going forward under contract were in encouraging tonnage. February sales showed improvement over January and were larger than was anticipated in most producing quarters. Prices were quite firm.

Potassium Bichromate—A slightly better demand was in evidence from the tanning trade. Prices ruled firm.

Potassium Carbonate—Sales for both domestic and imported were in greater volume at unchanged prices. The imports of potassium carbonate during 1930 were 9,120 short tons valued at $548,000 compared with 11,322 tons valued at $1,024,058 for 1929. Germany was the leading supplier with 6,645 tons compared to 9,878 tons for the previous years. There was an increase in the imports of this commodity from Soviet Russia from 453 tons in 1929 to 1,256 tons for 1930. Netherlands was the third largest supplier with 823 tons and Czechoslovakia fourth with 352 tons.

Potash Caustic—Dealers reported little change in the underlying factors going this commodity. The soap industry was more active with sales and inquiries considerably above the January level. The price situation is unchanged.

Potassium Permanganate—Shipments were moving out into consuming channels at a satisfactory pace. Prices were unaltered during the month.

Potash—Recognized representatives in this country were quoting unchanged prices despite the present decline in interest in fertilizer materials generally. The ten leading consumers of German potash fertilizer took a trifle more during 1930 in six instances and fell only a shade under their 1929 purchases in the other two. A table of the imports by these, in marks, follows (000 omitted):

	1928	*1929*	*1930*
Holland	9,010	10,940	11,470
United States	9,670	10,940	11,040
Sweden	4,460	6,840	6,520
Denmark	2,020	5,720	6,420
Czechoslovakia	3,930	7,440	5,310
Belgium-Luxemburg	1,600	3,240	3,510
Great Britain	2,380	2,950	2,610
Norway	1,820	2,100	2,430

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Orthonitroparachlorphenol, tins ....lb.	.70	.75	.70	.75	.75	.70	.75	.70
Osage Orange, crystals ....lb.	.16	.17	.16	.17	.17	.16	.17	.16
51 deg. liquid ....lb.	.07	.07½	.07	.07½	.07½	.07	.07½	.07
Powdered, 100 lb bags ....lb.	.14½	.15	.14½	.15	.15	.14½	.15	.14½
Paraffin, refd, 200 lb cs slabs								
123-127 deg. M. P. ....lb.	.03¼	.03	.03¼	.03	.04¼	.03½	.06½	.04½
128-132 deg. M. P. ....lb.	.03½	.03¼	.03½	.03¼	.06⅝	.03½	.07	.04⅝
133-137 deg. M. P. ....lb	.04⅝	.07¼	.04⅝	.07¼	.07¼	.04⅝	.07¼	.06½
Para Aldehyde, 110-55 gal drs ..lb.	.20½	.23	.20½	.23	.23	.20½	.28	.20½
Aminoacetanilid, 100 lb bg. ..lb.	.52	.60	.52	.60	1.05	.52	1.05	1.00
Aminohydrochloride, 100 lb kegs ....lb	1.25	1.30	1.25	1.30	1.30	1.25	1.30	1.25
Aminophenol, 100 lb kegs ..lb.	.84	.86	.84	.86	1.02	.92	1.15	.99
Chlorophenol, drums ....lb.	.50	.65	.50	.65	.65	.50	.65	.50
Coumarone, 330 lb drums. lb.	.....	.....	.....	.....	.....	.....	.....	.....
Cymene, refd, 110 gal dr ..gal.	2.25	2.50	2.25	2.50	2.50	2.25	2.50	2.25
Dichlorobenzene, 150 lb bblr wks ....lb.	.17	.20	.17	.20	.20	.17	.20	.17
Nitroacetanilid, 300 lb bbls .lb.	.50	.55	.50	.55	.55	.50	.55	.50
Nitroaniline, 300 lb bbls wks ....lb.	.48	.55	.48	.55	.55	.48	.55	.48
Nitrochlorobenzene, 1200 lb drs wks ....lb.	.23	.26	.23	.26	.26	.23	.26	23
Nitro-orthotoluidine, 300 lb bbls ....lb.	2.75	2.85	2.75	2.85	2.85	2.75	2.85	2.75
Nitrophenol 185 lb bbls ....lb.	.45	50	.45	.50	.50	.45	.55	.45
Nitrosodimethylaniline, 120 lb. bbls ....lb.	.92	.94	.92	.94	.94	.92	.94	.92
Nitrotoluene, 350 lb bbls ....lb.	.29	.31	.29	.31	.31	.29	.31	.29
Phenylenediamine, 350 lb bbls ....lb.	1.15	1.20	1.15	1.20	1.20	1.15	1.20	1.15
Tolueneulfonamide, 175 lb bbls ....lb.	.70	.75	.70	.75	.75	.70	.75	.70
Toluenesulfonchloride, 410 lb bbls wks ....lb.	.20	.22	.20	.22	.22	.20	.22	.20
Toluidine, 350 lb bbls wk ...lb.	.....	.44	.....	.44	.40	.38	.42	.38
Paris Green, Arsenic Basis								
100 lb kegs ....lb.	.....	.27	.....	.27	.27	.27	.27	25
250 lb kegs ....lb.	.....	.25	.....	.25	.25	.25	.25	.23
Persian Berry Ext., bbls ....lb.	.25	Nom.	.25	Nom.	Nom.	.25	25	.25
Pentasol (see Alcohol, Amyl) ...								
Pentasol Acetate (see Amyl Acetate)								
Petrolatum, Green, 300 lb bbl. lb.	.02	.02⅛	.02	.02⅛	.02⅛	.02	.02⅛	.02
Phenol, 250-100 lb drums ....lb.	.14¾	.15	.14¾	.15	.15	.14¾	.16	.13
Phenyl - Alpha - Naphthylamine, 100 lb kegs ....lb.	.....	1.35	.....	1.35	1.35	1.35	1.35	1.35
Phenylhydrazine Hydrochloride ....lb.	2.90	3.00	2.90	3.00	3.00	2.90		
Phosphate								
Phosphate Acid (see Superphosphate)								
Phosphate Rock, f.o.b. mines								
Florida Pebble, 68% basis ..ton	3.10	3.25	3.10	3.25	3.15	3.00	3.15	3.00
70% basis ....ton	3.75	3.90	3.75	3.90	4.00	3.75	4.00	3.50
72% basis ....ton	4.25	4.35	4.25	4.35	4.50	4.25	4.50	4.00
75-74% basis ....ton	5.25	5.50	5.25	5.50	5.50	5.25	5.50	5.00
75% basis ....ton	.....	5.75	.....	5.75	5.75	5.75	5.75	5.75
77-80% basis ....ton	.....	6.25	.....	6.25	6.25	6.25	6.25	6.25
Tennessee, 72% basis ....ton	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
Phosphorous Oxychloride 175 lb cyl ....lb.	.18	.20	.18	.20	.25	.18	.40	.20
Red, 110 lb cases ....lb.	.37½	.42	.37½	.42	.42	.37½	.60	.37½
Yellow, 110 lb cases wks ..lb.	.31	.37½	.31	.37½	.37½	.31	.32	.31
Sesquisulfide, 100 lb cs ....lb.	.....	.44	.....	.44	.44	.44	.46	.44
Trichloride, cylinders ....lb.	.18	.20	.18	.20	.25	.18	.35	.20
Phthalic Anhydride, 100 lb bbls wks ....lb.	.15	.16	.15	.16	.20	.15	.20	.18
Pigments Metallic, Red or brown bags, bbls, Pa. wks ....ton	37.00	45.00	37.00	45.00	45.00	37.00	45.00	37.00
Pine Oil, 55 gal drums or bbls								
Destructive dist ....lb.	.63	.64	.63	.64	.64	.63	.64	.63
Prime bbls ....bbl.	8.00	10.60	8.00	10.60	10.60	8.00	10.60	8.00
Steam dist. bbls ....gal.	.65	.70	.65	.70	.70	.65	.70	.65
Pitch Hardwood, ... wks ....ton	35.00	45.00	35.00	45.00	45.00	35.00	45.00	40.00
Plaster Paris, tech, 250 lb bbls ....bbl.	3.30	3.50	3.30	3.50	3.50	3.30	3.50	3.30
Potash								
Potash, Caustic, wks, solid ...lb.	.06⅛	.06⅜	.06⅛	.06⅜	.06⅜	.06⅛	.07¼	.06⅛
flake ....lb.	.0705	08	.0705	.08	.08	.0705	.07½	.0705
Potash Salts, Rough Kainit								
12.4% basis bulk ....ton	.....	9.20	.....	9.20	9.20	9.10	9.10	9.00
14% basis ....ton	.....	9.70	.....	9.70	9.70	9.60	9.60	9.50
Manure Salts								
20% basis bulk ....ton	.....	12.65	.....	12.65	12.65	12.50	12.50	12.40
30% basis bulk ....ton	.....	19.15	.....	19.15	19.15	18.95	18.95	18.75
Potassium Acetate ....lb.	.28	.30	.28	.30	.30	.27		
Potassium Muriate, 80% basis bags ....ton	.....	37.15	.....	37.15	37.15	36.75	36.75	36.40
Pot. & Mag. Sulfate, 48% basis bags ....ton	.....	27.80	.....	27.80	27.80	27.50	27.50	27.00
Potassium Sulfate, 90% basis bags ....ton	.....	48.25	.....	48.25	48.25	47.75	47.75	47.30
Potassium Bicarbonate, USP, 320 lb bbls ....lb.	.09½	.10	.09½	.10	.10	.09½	.14	.09½
Bichromate Crystals, 725 lb casks ....lb.	.08¾	.09½	.08¾	.09½	.09¼	.08¾	.09¼	.09
Powd., 725 lb cks wks ....lb.	.13	.13¼	.13	.13¼	.13½	.13	.13½	.13

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Feb. 1931 $1.315

	1928	*1929*	*1930*
Poland	1,140	8,370	1,840
Finland	2,430	1,590	1,690
Total	38,460	60,130	52,840

For a complete discussion of the German potash industry see the feature section of this issue.

Soda Ash—Producers were insisting on schedule prices on spot and contract business and the market was in a much firmer position than has prevailed for several months. During February, the leading manufacturers revised the less carlot schedule at several of the more important consuming centers for caustic as well as ash. This was done to bring the less carlot price structure in line with the new carlot prices and to further stabilize the industry. The new less carlot prices locally are as follows:

	Packing	New Jersey Philadelphia
76% Caustic—Solid	Drums	3.44
76% Caustic Ground or Flake	Drums	3.84
76% Caustic—Ground or Flake	Bbls.	4.09
58% Light Ash	Bbls.	2.17
58% Light Ash	Bags	1.94

The prices for New England, Chicago and Cleveland are as follows:

New England	*Chicago*	*Cleveland*
3.50	3.43	3.34
3.90	3.83	3.74
4.15	4.08	3.99
2.23	2.16	2.07
2.00	1.93	1.84

The above prices are for five packages or more. Less than five packages 15c additional per cent.

Soda Caustic—Further stabilization of prices occurred during the month. Shipments continued to gain as the month closed and the industry is looking forward to further improvement in March. Several of the large alkali consuming industries are now operating at greater speed, and paper and textile industries particularly.

Sodium Bichromate—Contract shipments were reported as being satisfactory, but new business was spotty and generally under normal. The price structure remains unaltered at 7c for carlots and 7½c for less than carload.

Saltcake—The paper trade was reported as taking larger quantities on existing contracts. While prices have shown little inclination to strengthen further, producers were firm at the levels established two months ago. Canada's imports of salt cake during the six months ended September, 1930, totaled 12,764 short tons compared with 15,472 tons in

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Binoxiate, 300 lb bbls......lb.	.14	.17	.14	.17	.17	.14	.17	.14
Bisulfate, 100 lb kegs......lb.	.....	.30	.....	.30	.30	.30	.30	.30
Carbonate, 80-85% calc. 800 lb casks..............lb.	.05⅜	.05¾	.05⅜	.05¾	.05¾	.05⅜	.05¾	.05⅜
Chlorate crystals, powder 112 lb keg wks...........lb.	.08	.08½	.08	.08½	.09	.08	.09	.08½
Chloride, crys bbls.........lb.	.05½	.06	.05½	.06	.06	.05½	.05½	.05½
Chromate, kegs...........lb.	.23	.28	.23	.28	.28	.23	.28	.23
Cyanide, 110 lb. cases.....lb.	.55	.57½	.55	.57½	.57½	.55	.57½	.55
Metabisulfite, 300 lb. bbl...lb.	.12	.13	.12	.13	.13	.12	.13	.11
Oxalate, bbls............lb.	.20	.24	.20	.24	.24	.20	.24	.16
Perchlorate, casks wks.....lb.	.11	.12	.11	.12	.12	.11	.12	.11
Permanganate, USP, crys 500 & 100 lb drs wks........lb.	.16	.16½	.16	.16½	.16½	.16	.16½	.16
Prussiate, red, 112 lb keg...lb.	.38	.40	.38	.40	.40	.38	.40	.38
Yellow, 500 lb casks.....lb.	.18½	.21	.18½	.21	.21	.18½	.21	.18½
Tartrate Neut, 100 lb keg..lb.	.....	.21	.....	.21	.21	.21	.51	.51
Titanium Oxalate, 200 lb bbls ....lb.	.21	.23	.21	.23	.23	.21	.25	.21
Propyl Furoate, 1 lb tins.....lb.	.....	5.00	.....	5.00	5.00	5.00	5.00	5.00
Pumice Stone, lump bags.....lb.	.04	.05	.04	.05	.05	.04	.05	.04
250 lb bbls.............lb.	.04½	.06	.04½	.06	.06	.04½	.06	.04½
Powdered, 350 lb bags.....lb.	.02½	.03	.02½	.03	.03	02½	.03	.02½
Putty, commercial, tubs..100 lb.	.....	.03¼	.....	.03¼	.03¼	.03¼	.03¼	.03¼
Linseed Oil, kegs......100 lb.	.....	.05½	.....	.05½	.05½	.05½	.05½	.05½
Pyridine, 50 gal drums......gal.	1.50	1.75	1.50	1.75	1.75	1.50	1.75	1.50
Pyrites, Spanish cif Atlantic ports bulk.............unit	.13	.13¾	.13	.13¾	.13¾	.13	.13¾	.13
Quebracho, 35% liquid tks....lb.	.02¾	.04	.02¾	.04	.04	.02¾	.04	.03
450 lb bbls c-1..........lb.	.03¼	.03¾	.03¼	.03¾	.03¾	.03¼	.04¼	.03½
35% Bleaching, 450 lb bbl .lb.	.04¼	.05¼	.04¼	.05¼	.04¼	.05¼	.04¼	.05¼
Solid, 63%, 100 lb bales cif..lb.	.05	.05½	.05	.05½	.05½	.05	.05¾	.05½
Clarified, 64%, bales.....lb.	.....	.05⅜	.....	.05⅜	.05⅜	.05⅜	.05⅜	.05⅜
Quercitron, 51 deg liquid 450 lb bbls.................lb.	.05½	.06	.05½	.06	.06	.05½	.06	.05½
Solid, 100 lb boxes.........lb.	.09½	.13	.09½	.13	.13	.09½	.13	.10
Bark, Rough...........ton	.....	14.00	.....	14.00	14.00	14.00	14.00	14.00
Ground................ton	34.00	35.00	34.00	35.00	35.00	34.00	35.00	34.00
R Salt, 250 lb bbls wks......lb.	.40	.44	.40	.44	.45	.40	.46	.44
Red Sanders Wood, grd bbls..lb.	.....	.18	.....	.18	.18	.18	.18	.18
Resorcinol Tech, cans........lb.	.90	1.25	.90	1.25	1.25	.90	1.25	1.15
Rosin Oil, 50 gal bbls, first run ....gal.	.56	.58	.56	.58	.58	.56	.62	.57
Second run............gal.	.59	.61	.59	.61	.61	.59	.64	.60

Rosin

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Rosins 600 lb bbls 280 lb...unit								
B........................	.....	4.15	4.15	4.95	7.75	5.35	9.25	7.45
D........................	.....	4.60	4.60	5.10	8.00	5.50	9.25	7.70
E........................	.....	5.05	4.85	5.30	8.17	5.52½	9.27	8.30
F........................	.....	5.25	5.05	5.35	8.45	5.55	9.27	8.40
G........................	.....	5.35	5.15	5.40	8.45	5.60	9.45	8.40
H........................	.....	5.45	5.20	5.53½	8.55	5.60	9.50	8.40
I........................	.....	5.50	5.25	5.57½	8.58	5.62½	9.50	8.40
K........................	.....	5.75	5.40	5.75	8.65	5.62½	9.55	8.45
M........................	.....	6.05	5.65	6.05	8.80	5.65	9.85	8.50
N........................	.....	6.45	6.15	6.45	8.95	6.05	10.30	8.93
WG........................	.....	7.80	7.65	7.80	9.25	6.85	11.30	9.00
WW........................	.....	8.65	8.40	8.65	9.85	7.85	12.30	9.30
Rotten Stone, bags mines....ton	24.00	20.00	24.00	20.00	30.00	18.00	30.00	24.00
Lump, imported, bbls......lb.	.05	.07	.05	.07	.07	.05	.08	.05
Selected bbls............lb.	.09	.12	.09	.12	.12	.09	.12	.09
Powdered, bbls...........lb.	.02	.05	.02	.05	.05	.02	.05	.02
Sago Flour, 150 lb bags......lb.	.04½	.05	.04½	.05	.05	.04½	.05	.04½
Sal Soda, bbls wks.......100 lb.	....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Salt Cake, 94-96% c-1 wks. .ton	15.50	19.00	15.50	19.00	24.00	15.50	24.00	19.00
Chrome ....ton	14.50	17.00	14.50	17.00	25.00	14.50	21.00	12.00
Saltpetre, double refd granular 450-500 lb bbls.........lb.	.06⅛	.06¾	.06⅛	.06¾	.06¾	.06⅛	.06½	.06⅛
Satin, White, 500 lb bbls.....lb	.....	.01½	.....	.01½	.01½	.01¼	.01½	.01½
Shellac Bone dry bbls........lb.	.28	.29	.28	.29	.47	.28	.61	.47
Garnet, bags..............lb.	.22	.26	.24	.26	.40	.24	.45	.40
Superfine, bags...........lb.	.20	.22	.19	.22	.39	.20	.47	.39
T. N. bags...............lb.	.....	.17	.....	.17	.34	.18	.44	.36
Schaeffer's Salt, kegs.........lb.	.53	.57	.53	.57	.57	.53	.57	.53
Silica, Crude, bulk mines....ton	8.00	11.00	8.00	11.00	11.00	8.00	11.00	8.00
Refined, floated bags......ton	22.00	30.00	22.00	30.00	30.00	22.00	30.00	22.00
Air floated bags........ton	.....	32.00	.....	32.00	32.00	32.00	32.00	32.00
Extra floated bags......ton	32.00	40.00	32.00	40.00	40.00	32.00	40.00	32.00
Soapstone, Powdered, bags f. o. b. mines................ton	15.00	22.00	15.00	22.00	22.00	15.00	22.00	15.00

Soda

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Soda Ash, 58% dense, bags c-1 wks................100 lb.	.....	1.17½	.....	1.17½	1.40	1.40	1.40	1.40
58% light, bags.......100 lb.	.....	1.15	.....	1.15	1.34½	1.34½	1.34½	1.34½
Contract, bags c-1 wks.100 lb.	.....	.....	.....	.....	1.32	1.32	1.32	1.32
Soda Caustic, 76% grnd & flake drums..............100 lb.	.....	2.90	.....	2.90	3.35	3.00	3.35	3.35
76% solid drs.........100 lb.	.....	2.50	.....	2.50	2.95	2.90	2.95	2.95
Sodium Acetate, tech....450 lb. bbls wks................lb.	.04½	.05	.04½	.05	.05½	.04	.06¼	.04⅞
Arsenate, drums...........lb.	.18	.19	.18	.19	.19	.18	.19	.18
Arsenite, drums...........gal.	.50	.75	.50	.75	1.00	.50	1.50	.75
Bicarb, 400 lb bbl NY..100 lb.	.....	.....	.....	.....	2.41	2.41	2.41	2.41

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Feb. 1931 $1.315

the corresponding period of 1929. Niter cake imports were 46,000 tons and 6,662 tons, respectively. In contrast, glauber salts which is imported in much smaller quantities increased from 140 to 298 short tons.

Shellac—The serious curtailment of purchases spread over the past few months caused a definite reflection during the past month and inquiries and sales were in much better volume. Several of the grades were higher, T. N. Calcutta advancing 1¼c. Markets abroad both in London and Calcutta were firmer. Estimated shipments of shellac from Calcutta to all ports during the first half of February total 15,000 packages. The total for the same time last year was 16,600, and two years ago, 13,200 packages. Shipments to the United States were 3,800 packages, against 6,600 during the same period last year, and 11,100 during the first half of February, 1929. Those to the United Kingdom, 6,500, against 7,000 and 1,100 packages, respectively; to the Continent, 4,700, against 3,000 and 1,000. The United States shipments comprised 2,000 packages of orange shellac and 1,800 seedlac. During the same period last year the shipments comprised 4,500 orange, 700 garnet and 1,400 seedlac. During the corresponding time two years ago the shipments to United States were 9,400 orange, 800 garnet 100 button and 800 seedlac.

FATS AND OILS

A complete report of Fats and Oils Statistics for the fourth quarter of 1930 is given on page 272 of the news section.

Fats and Oils — Business continued throughout the month to reflect the belief on the part of buyers that it was unwise to contract ahead for any considerable period of time when surplus stocks are still unusually heavy and reductions still outweighing the slight advances made in a very restricted list. Leading factors in the markets reported however that February was slightly ahead of January and some increase in inquiries was noticeable. Figures for the export of domestic oils and fats for the last quarter of 1930 released by the Department of Commerce were as follows:

Exports of Domestic Fats and Oils

	Pounds
Oleo oil	14,199,170
Oleo stock	1,979,784
Tallow	1,456,514
Lard	129,061,885
Lard, neutral	2,833,216
Lard compounds, containing animal fats	706,956
Oleo and lard stearin	1,582,894
Neatsfoot oil	375,789
Other animal oils, inedible	689,949
Fish oils	640,056
Grease stearin	1,569,125
Oleic acid, or red oil	278,398
Stearic acid	62,587

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Bichromate, 500 lb cks wks.lb.	.07	.07½	.07	.07½	.07½	.07	.07¾	.07
Bisulfite, 500 lb bbl wks....lb.	.....	.04	.....	.04	.04	.04	.04	.04
Carb. 400 ib bbls NY..100 lb.	.....	2.30	.....	2.30	2.30	2.30	1.35	1.30
Chlorate, ... wks..lb.	.05½	.07¾	.05½	.07¾	.08	.05½	.11	.06½
Chloride, technical........ton	12.00	13.00	12.00	13.00	13.00	12.00	13.00	12.00
Cyanide, 96-98%, 100 & 250 lb drums wks...........lb.	.16	.17	.16	.17	.20	.16	.20	.18
Fluoride, 300 lb bbls wks...lb.	.08½	.08½	.08½	.08½	.09	.08½	.09	.08½
Hydrosulfite, 200 lb bbls f. o. b. wks................lb.	.22	.24	.22	.24	.24	.22	.24	.22
Hypochloride solution, 100 lb cbys.................lb.	.....	.05	.....	.05	.05	.05	.05	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks......100 lb.	2.40	3.00	2.40	3.00	3.00	2.40	3.05	2.50
Technical, regular crystals 375 lb bbls wks....100 lb.	2.50	2.65	2.50	2.65	2.65	2.50	2.65	2.40
Metanilate, 150 lb bbls.... lb.	.44	.45	.44	.45	.45	.44	.45	.45
Monohydrate, bbls........lb.	.....	.02½	.....	.02½	.02½	.02½	.02½	.02½
Naphthionate, 300 lb bbl...lb.	.52	.54	.52	.54	.57	.52	.57	.54
Nitrate, 92%, crude, 200 lb bags c-1 NY......100 lb.	.....	2.07	2.02	2.07	2.22½	1.99	2.22½	2.09
Nitrite, 500 lb bbls spot....lb.	.07½	.08	.07½	.08	.08	.07½	.08	.07½
Orthochlorotoluene, sulfonate, 175 lb bbls wks.......lb.	.25	.27	.25	.27	.27	.25	.27	.25
Oxalate Neut, 100 lb kegs..lb.	.37	.42	.37	.42	.42	.37	.42	.37
Perborate, 275 lb bbls.....lb.	.18	.20	.18	.20	.20	.18	.22	.18
Phosphate, di-sodium, tech. 310 lb bbls.......100 lb.	2.65	3.00	2.65	3.00	3.25	2.65	3.55	3.25
tri-sodium, tech, 325 lb bbls...............100 lb.	3.25	3.50	3.25	3.50	4.00	3.25	4.00	3.90
Picramate, 100 lb kegs.....lb.	.69	.72	.69	.72	.72	.69	.72	.69
Prussiate, Yellow, 350 lb bbl wks.................lb.	.11½	.12	.11½	.12	12½	.11½	.12½	.12
Pyrophosphate, 100 lb keg..lb.	.15	.20	.15	.20	.20	.15	.20	.15
Silicate, 60 deg 55 gal drs, wks ....100 lb.	.....	1.65	.....	1.65	1.65	1.65	1.65	1.65
40 deg 55 gal drs, wks ....100 lb.	.75	1.00	.75	1.00	.80	.70	.80	.70
Silicofluoride, 450 lb bbls NY ....lb.	.04	.04¾	.04	.04¾	.05½	.04	.05½	.05
Stannate, 100 lb drums....lb.	.23½	.26	.23½	.26	.43	.24	.43	.38
Stearate, bbls............lb.	.20	.25	.20	.25	.29	.20	.29	.25
Sulfanilate, 400 lb bbls....lb.	.16	.18	.16	.18	.18	.16	.18	.16
Sulfate Anhyd, 550 lb bbls c-1 wks.............lb.	.02½	.02¾	.02½	.02¾	.02¾	.02½	.02¾	.02½
Sulfide, 80% crystals, 440 lb bbls wks.............lb.	.02½	.02¾	.02½	.02¾	.02¾	.02½	.02¾	.02½
62% solid, 650 lb drums 1c-1 wks.............lb.	.03	.03¼	.03	.03¼	.03¼	.03	.04	.03¼
Sulfite, crystals, 400 lb bbls wks.................lb.	.03	.03¼	.03	.03¼	.03¼	.03	.03½	.03
Sulfocyanide, bbls.........lb.	.28	.35	.28	.35	.35	.28	.76	.28½
Tungstate, tech, crystals, kegs ....lb.	.81	.88	.81	.88	.88	.81	1.40	.88
Solvent Naphtha, 110 gal drs wks.................gal.	.30	.38	.30	.38	.40	.30	.40	.35
Spruce, 25% liquid, bbls.....lb.	.....	.01¾	.....	.01¾	.01¾	.01¾	.01¾	.01¾
25% liquid, tanks wks.....lb.	.....	.01	.....	.01	.01	.01	.01	.01
50% powd, 100 lb bag wks lb.	.02	.02¼	.02	.02¼	.02¼	.02	.02¼	.02
Starch, powd., 140 lb bags ....100 lb.	.....	2.92	2.92	3.20	4.02	3.42	4.12	3.82
Pearl, 140 lb bags.....100 lb.	.....	2.82	2.82	3.00	3.92	3.32	4.02	3.72
Potato, 200 lb bags........lb.	.05½	.06	.05½	.06	.06½	.05½	.06¾	.05¾
Imported bags..........lb.	.05¾	.06¼	.05¾	.06¼	.06½	.05¾	.06¾	.05¾
Soluble................lb.	.08	.08½	.08	.08½	.08½	.08	.08½	08
Rice, 200 lb bbls..........lb.	.09	.10	.09	.10	.10	.09	.10	.09½
Wheat, thick bags.........lb.	.06½	.07	.06½	.07	.07	.06½	.07	.06½
Thin bags..............lb.	.09½	.10	.09½	.10	.10	.09½	.10	.09½
Strontium carbonate, 600 lb bbls wks..................lb.	.07¼	.07½	.07¼	.07½	.07½	.07½	.07½	.07¼
Nitrate, 600 lb bbls NY....lb.	.09	.09¼	.09	.09¼	.09¼	.09	.09¼	.08¾
Peroxide, 100 lb drs.......lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25

Sulfur

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Sulfur Brimstone, broken rock, 250 lb bag c-1.......100 lb.	.....	2.05	.....	2.05	2.05	2.05	2.05	2.05
Crude, f. o. b. mines......ton	18.00	19.00	18.00	19.00	19.00	18.00	19.00	18.00
Flour for dusting 99½%, 100 lb bags c-1 NY....100 lb.	.....	2.40	.....	2.40	2.40	2.40	2.40	2.40
Heavy bags c-1......100 lb.	.....	2.50	.....	2.50	2.50	2.50	2.50	2.50
Flowers, 100%, 155 lb bbls c-1 NY..............100 lb.	.....	3.45	.....	3.45	3.45	3.45	3.45	3.45
Roll, bbls 1c-1 NY.....100 lb.	2.65	2.85	2.65	2.85	2.85	2.65	2.85	2.65
Sulfur Chloride, red, 700 lb drs wks..................lb.	.05	.05½	.05	.05½	.05½	.05	.05½	.05
Yellow, 700 lb drs wks.....lb.	.03½	.04½	.03½	.04½	.04½	.03½	.04½	.03½
Sulfur Dioxide, 150 lb cyl....lb.	.07	.07½	.07	.07½	.07½	.07	.08½	.07
Extra, dry, 100 lb cyl......lb.	.10	.12	.10	.12	.12	.10	.19	.10
Sulfuryl Chloride,.........lb.	.15	.40	.15	.40	.65	.10	.65	.10
Talc, Crude, 100 lb bgs NY...ton	12.00	15.00	12.00	15.00	15.00	12.00	15.00	12.00
Refined, 100 lb bgs NY..ton	16.00	18.00	16.00	18.00	18.00	16.00	18.00	16.00
French, 220 lb bags NY...ton	18.00	22.00	18.00	22.00	22.00	18.00	25.00	18.00
Refined, white, bags....ton	35.00	40.00	35.00	40.00	40.00	35.00	45.00	35.00
Italian, 220 lb bags NY...ton	40.00	50.00	40.00	50.00	50.00	40.00	50.00	40.00
Refined, white, bags....ton	50.00	55.00	50.00	55.00	55.00	50.00	55.00	50.00
Superphosphate, 16% bulk, wks....................ton	8.00	9.00	8.00	9.00	9.50	8.00	10.00	9.00
Triple bulk, wks.........unit	.....	.65	.....	.65	.65	.65	.....	.....
Tankage Ground NY.......unit	.....	2.75&10	2.75	3.20&10	4.00&10	3.20&10	4.50&10	4.00&10
High grade f.o.b. Chicago.unit	.....	3.00&10	3.00	3.25&10	3.85&10	3.25&10	4.80&10	3.75&10
South American cif.......unit	.....	3.20&10	3.20	3.40&10	4.25&10	3.40&10	4 80&10	4.35&10
Tapioca Flour, high grade bgs.lb.	.03½	.05	.03½	.05	.05¾	.03	.05¾	.04½
Medium grade, bags.....lb.	.03	.04	.03	.04	.04¾	.02½	.04¾	.03¾
Tar Acid Oil, 15%,drums....gal.	.24	.25	.24	.25	.27	.24	.27	.26
25% drums............gal.	.26	.28	.26	.28	.30	.26	.30	.29

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1930 Average $1.161 - Jan. 1930 $1.072 - Feb. 1931 $1.315

	Pounds
Other animal greases and fats	18,039,702
Cottonseed oil, crude	1,845,366
Cottonseed oil, refined	4,699,871
Corn oil	175,035
Vegetable oil lard compounds	1,552,065
Other edible vegetable oils & fats	1,184,922
Coconut oil	5,887,867
Linseed oil	360,857
Soy bean oil	1,273,027
Vegetable soap stock	4,521,745
Other expressed oils and fats, inedible	1,275,801
Glycerin	102,468

Chinawood Oil — While there was very little change in published prices the tone of the market both locally and on the Pacific Coast was in decided contrast with the sentiment prevailing as late as a month ago. Importers were disposed to ask higher prices in replying to inquiries. Importations into the United States during January were 6,158,267 pounds, valued at $421,254, as compared with importations of 9,816,434 pounds, valued at $1,162,475 in January last year. A cable dispatched by the American consulate at Hankow to the Chemical Division, Bureau of Foreign and Domestic Commerce, states that the situation of the tung oil market at Hankow during January was as follows: Total January tung oil exports from Hankow amounted to 4,044,000 pounds, of which the United States received 2,738,000 pounds, with 1,306,000 pounds going to Europe. Consumption of tung oil in China for use as an illuminant has been increasing, the total quantity used for this purpose the last month was 2,400,000 pounds. The increase is attributed principally to its use as a substitute for kerosene, the price of which has been greatly affected by the exchange rate. Stocks on hand at Hankow the end of January were estimated at 3,945 short tons.

Cocoanut Oil — Local dealers were asking higher prices as the month closed, but sales were limited to replacements of present stock. The price of 4⅜c for shipment in seller's tanks remained unaltered.

Corn Oil — In the face of a lessening demand producers were holding prices in a firm position. The ruling price in buyer's tanks, f. o. b. western mill points remained steady at 7½c. Inquiry for refined oil was in more satisfactory volume and the price in barrels ranged from 10¼—10½c.

Cottonseed Oil — Continued firmness in the refined oil market was aided by further strengthening in the price of crude. During the year ended July 31, 1930, approximately 215,000 short tons of cottonseed meal were used as fertilizer, according to reports received by the Bureau of Agricultural Economics of the Department of Agriculture. This figure represents about 9 per cent of the total meal produced from the 1929 crop of seed. For the preceding year (ended July 31, 1929) approximately 183,000 tons, or about 8

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Terra Alba Amer. No. 1, bgs or bbls mills......100lb.	1.15	1.75	1.15	1.75	1.75	1.15	1.75	1.15
No. 2 bags or bbls...100lb.	1.50	2.00	1.50	2.00	2.00	1.50	2.00	1.50½
Imported bags......lb.	.01⅛	.01¼	.01⅛	.01¼	.01¼	.01⅛	.02¼	.01
Tetrachlorethane, 50 gal dr...lb.	.09	.09½	.09	.09½	.09½	.09	.09½	.09
Tetralene, 50 gal drs wks.....lb.	.....	.20	.....	.20	.20	.20	.20	.20
Thiocarbanilid, 170 lb bbl....lb.	.26½	.28½	.26½	.28½	.28½	.22	.24	.22
Tin Bichloride, 50% soln, 100 lb bbls wks......lb.	.....	.12¾	.....	.12¾	.12¾	.12¾	.14¾	.13½
Crystals, 500 lb bbls wks...lb.	.26	.27	.25	.28½	.34	.25	.38	.33
Metal Straits NY......lb.	.27	.27	.25⅜	.27	.38	.26	.48	.39
Oxide, 300 lb bbls wks.....lb.	.25	.29	.25	.29	.42	.25	.56	.42
Tetrachloride, 100 lb drs wks......lb.	.. 19¼	.19½	.. 18¼	.19½	.20½	.18¼	.30½	.27¼
Titanium Dioxide 300 lb bbl..lb	.21	.22	.21	.22	.50	.21	.50	.22
Pigment, bbls......lb.	.06½	.07¾	.06½	.07¾	.07¾	.06½	.14	.07½
Toluene, 110 gal drs......gal.	.....	.34	.....	.34	.40	.35	.45	.45
8000 gal tank cars wks....gal.	.28	.30	.28	.30	.35	.30	.40	.40
Toluidine, 350 lb bbls......lb.	.90	.94	.90	.94	.94	.90	.94	.90
Mixed, 900 lb drs wks.....lb.	.27	.32	.27	.32	.32	.27	.32	.31
Toner Lithol, red, bbls......lb.	.90	.95	.90	.95	.95	.90	.95	.85
Para, red, bbls......lb.	.....	.80	.....	.80	.80	.80	.80	.70
Toluidine ......lb.	1.50	1.55	1.50	1.55	1.55	1.50	1.55	1.50
Triacetin, 50 gal drs wks.....lb.	.32	.36	.32	.36	.36	.32	.36	.32
Trichlorethylene, 50 gal dr...lb.	.10	.10½	.10	.10½	.10½	.10	.10½	.10
Triethanolamine, 50 gal drs...lb.	.40	.42	.40	.42	.42	.40	.60	.55
Tricresyl Phosphate, drs.....lb.	.33	.45	.33	.45	.45	.33	.45	.33
Triphenyl guanidine......lb.	.58	.60	.58	.60	.60	.58	.70	.58
Phosphate, drums......lb.	.60	70	.60	.70	.70	.60	.75	.60
Tripoli, 500 lb bbls......100 lb.	.75	2.00	.75	2.00	2.00	1.75	2.00	1.75
Turpentine Spirits, bbls.....gal.	.45¼	.46	.45¼	.46	.61¼	.41	.65	.51½
Wood Steam dist. bbls....gal.	.37	.39	.37	.39	.52	.36	.57	.49
Urea, pure, 112 lb cases......lb	.15	.17	.15	.17	.17	.15	.30	.15
Fert. grade, bags c.i.f.....ton	....	108.00	.....	108.00	108.00	108.00	105.00	98.00
c. i. f. S. points......ton	.....	109.30	.....	109.30	109.30	109.30	106.30	99.30
Valonia Beard, 42%, tannin bags......ton	.....	40.00	.....	40.00	40.00	39.50	55.00	42.00
Cups, 30-31% tannin.....ton	24.00	25.00	24.00	25.00	27.00	24.00	35.00	30.00
Mixture, bark, bags......ton	30.00	31.00	30.00	31.00	32.50	30.00	43.00	35.00
Vermillion, English, kegs....lb..	1.75	1.80	1.75	1.80	2.05	1.75	2.05	2.00
Vinyl Chloride, 16 lb cyl.....lb.	.....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Wattle Bark, bags......ton	39.00	41.00	39.00	41.00	47.75	40.00	49.75	43.50
Extract 55%, double bags ex-dock......lb.	.05⅞	.06½	.05⅞	.06½	.06½	.05⅞	.06½	.06½
Whiting, 200 lb bags, c-1 wks......100 lb.	.....	1.00	.....	1.00	1.00	1.00	1.25	1.00
Alba, bags c-1 NY......ton	.....	13.00	.....	13.00	13.00	13.00	13.00	13.00
Gilders, bags c-1 NY...100 lb.	.....	1.35	.....	1.35	1.35	1.35	1.35	1.35
Xylene, 10 deg tanks wks. .gal.	.....	.28	.....	.28	.31	.28	.33	.33
Commercial, tanks wks...gal.	.25	.30	.25	.30	.33	.25	.32	.30
Xylidine, crude......lb.	.....	.37	.....	.37	.38	.37	.38	.38

Zinc

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Zinc Ammonium Chloride powd., 400 lb bbls......100 lb.	5.25	5.75	5.25	5.75	5.75	5.25	5.75	5.25
Carbonate Tech, bbls NY..lb.	.10½	.11	.10½	.11	.11	.10½	.11	.10½
Chloride Fused, 600 lb drs. wks......lb.	.05¾	.06	.05¾	.06	.06	.05¾	.06	.05¾
Gran., 500 lb bbls wks.....lb.	.05⅜	.06	.05⅜	.06	.06½	.05⅜	.06½	.06¼
Soln 50%, tanks wks...100 lb.	2.25	3.00	2.25	3.00	3.00	2.25	3.00	3.00
Cyanide, 100 lb drums.....lb	.38	.39	.38	.39	.41	.38	.41	.40
Dithiofuroate, 100 lb dr....lb.	.....	1.00	.....	1.00	1.00	1.00	1.00	1.00
Dust, 500 lb bbls c-1 wks...lb.	.06	.07	.06	.07	.11	.06	.08¼	.08½
Metal, high grade slabs c-1 NY......100 lb.	4.25	4.45	4.35	4.45	6.45	4.10	6.45	6.45⅜
Oxide, American bags wks..lb.	.06½	.07	.06½	.07	.07⅜	.06½	.07⅛	.07
French, 300 lb bbls wks...lb.	.09⅜	.11⅜	.09⅜	.11⅜	.11⅜	.09⅜	.11⅜	.09⅜
Perborate, 100 lb drs......lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25
Peroxide, 100 lb drs......lb.	.....	1.25	.....	1.25	1.25	1.25	1.25	1.25
Stearate, 50 lb bbls......lb.	.19	.22	.19	.23	.26	.20	.26	.25
Sulfate, 400 bbl wks......lb.	.03	.03½	.03	.03½	.03½	.03	.03¾	.03
Sulfide, 500 lb bbls......lb.	.16	.16½	.16	.16½	.32	.16	.32	.30
Sulfocarbolate, 100 lb keg..lb.	.28	.30	.28	.30	.30	.28	.30	.28
Zirconium Oxide, Nat. kegs...lb.	.02½	.03	.02½	.03	.03	.02½	.03	.02½
Pure kegs......lb.	.45	.50	.45	.50	.50	.45	.50	.45
Semi-refined kegs......lb.	.08	.10	.08	.10	.10	.08	.10	.08

Oils and Fats

	Current Market		1931 Low	1931 High	1930 High	1930 Low	1929 High	1929 Low
Castor, No. 1, 400 lb bbls.....lb.	.11½	.12	.11½	.12	.13½	.11½	.13½	.13
No. 3, 400 lb bbls......lb.	.11¼	.11¾	.11¼	.11¾	.13	.11	.13	.12½
Blown, 400 lb bbls......lb.	.13¾	.14	.13¾	.14	.15	.12	.15	.14
China Wood, bbls spot NY...lb.	.07	.07½	.07	.07½	.13	.07	.16	.14¼
Tanks, spot NY......lb.	.06½	.07	.06	.07	.11⅜	.06	.15	.13¼
Coast, tanks, ...lb.	.06	.06½	.05½	.06½	.10⅞	.05½	.14¼	.12¾
Cocoanut, edible, bbls NY....lb.	.....	.10¾	.....	.10¾	.10¾	.10¾	.10¾	.10¾
Ceylon, 375 lb bbls NY....lb.	.06⅛	.06½	.06⅛	.06½	.08¼	.06⅜	.09½	.07⅞
8000 gal tanks NY......lb.	.05½	.06	.05½	.06	.07	.05½	.08⅜	.06⅞
Cochin, 375 lb bbls NY....lb.	.06¾	.07	.06¾	.07	.09¼	.07¼	.10	.09¾
Tanks NY......lb.	.....	.07	.....	.07	.08½	.07	.09¼	.08¾
Manila, bbls NY......lb.	.06⅛	.07	.06⅛	.07	.08¼	.06½	.09⅜	.07⅞
Tanks NY......lb.	.04¾	.05	.04¾	.05	.07⅛	.05⅜	.08⅜	.06⅞
Tanks, Pacific Coast.....lb.	.04½	.05	.04½	.05	.07	.05⅜	.08	.06⅜

Prices Current and Comment

per cent, of the meal produced from the 1928 crop of seed were used as fertilizer. Of the 215 329 tons used as fertilizer during the year ended July 31. 1930, approximately 139,306 tons were used directly by farmers and 76,023 tons by manufacturers in the production of commercial fertilizer. During the preceding year 108,000 tons were used directly by farmers and 75,310 tons by fertilizer manufacturers. The total supply of cottonseed cake and meal available in the 1929-30 season was about 2,300,000 tons.

Linseed Oil — Activity in this commodity was limited mainly to small sales for prompt delivery although several large buyers were said to be placing at least part of the entire year's requirements at present figures. Rumors were quite current in the local market as the month closed stressing the expectation of a rather important increase in prices.

Menhaden Oil — Spot business was better during February than in January, but as yet buyers are still unwilling to contract ahead very far into the future. Stocks were reported to be in the neighborhood of 25,000 barrels. Crude menhaden oil production for 1930 was the smallest during the past 20 years. Last year's output on the Atlantic Coast totaled 47,000 barrels as compared with 65,000 barrels in 1929, which was the previous low figure for many years.

Perilla Oil — Considerable interest developed in this commodity during February and a large part of the surplus stocks was removed from the market entirely. The ruling quotations were based on 6½c, seller's tanks, Pacific Coast.

Rapeseed Oil — With conditions at the primary sources much firmer the local market stiffened. Stocks held locally are reported at being at the lowest figure prevailing for the past several months.

Red Oil — Demand was moderate with shipments on contract going forward in fail volume but with spot business restricted to a relatively few small orders or immediate shipment.

Palm Oil — This article was one of the most active in the list and several sales of important tonnages were reported at firm prices.

Greases — Trading was spasmodic in the local trade. Offerings were in larger quantity, but buyers were exhibiting a strong reluctance to do anything other than to cover immediate requirements.

Soyabean Oil—Trading was stimulated considerably on the Coast when importers were reported as offering material at favorable concessions. The nominal quotation for tanks remained unchanged at 5½c. Locally the market was very quiet.

	Current Market		1931		1930		1929	
			Low	High	High	Low	High	Low
Cod, Newfoundland, 50gal bbls ....gal.	.42	.44	.42	.44	.56	.46	.64	.57½
Tanks NY ....gal.	.39	.40	.39	.40	.62	.48	.60	.60
Cod Liver see Chemicals........								
Copra, bags ....lb.	.0255	.0275	...0255	.0275	.046	.039	.05½	.042
Corn, crude, bbls NY ....lb.	.....	.09	.....	.09	.10	.08½	.10¼	.09½
Tanks, mills ....lb.	.07⅜	.07½	.07	.07½	.08	.06½	.09¼	.07⅞
Refined, 375 lb bbls NY ....lb.	.10¼	.10½	.10¼	.10½	.10½	.09½	.11¼	.10¼
Tanks ....lb.	.08½	.08¾	.08¼	.08¼	.10	.08	.11	.09
Cottonseed, crude, mill ....lb.	.06⅛	.07	.06⅛	.07	.07½	.06⅛	.09	.08⅛
PSY 100 lb bbls spot ....lb.	.074	.08	.074	.08	.088	.076	.1075	.085
Mar ....lb.	.....	.0748	.....	....	....	....	.....	....
Degras, American, 50 gal bbls NY ....lb.	.04½	.04½	.04	.04¼	.04½	.03½	.05	.03½
English, brown, bbls NY ....lb.	.04½	.05	.04¼	.05	.05	.04½	.05⅜	.04½
Light, bbls NY ....lb.	.05	.05½	.05	.05½	.05½	.05	.05½	.05
Dog Fish, Coast Tanks ......gal.	.....	.32	.....	32	.34	.32		
Greases								
Greases, Brown ....lb.	.03⅞	.04¼	.03⅞	.04¼	.06½	.04	.08½	.06
Yellow ....lb.	.03	.04	.03	.04	.07½	.03⅞	.08½	.06½
White, choice bbls NY .....lb	.05	.05½	.05	.05½	.08½	.06	.11½	.07½
Herring, Coast, Tanks ......gal.	.....	Nom.	.....	Nom.	.....	.....		
Horse, bbls ....lb.	.05¼	Nom.	.05¼	Nom.	Nom.	.05½	Nom.	.....
Lard Oil, edible, prime ....lb.	.12½	.13	.12½	.13	.13½	.12½	.15¾	.14¾
Extra, bbls ....lb.	.09½	.10	.09½	.10	.12	.10	.13½	.12
Extra No. 1, bbls ....lb.	.08¾	.09¾	.08¾	.09¾	.11	.09¾	.13½	.11¾
Linseed, Raw, five bbl lots ...lb.	.098	.102	.096	.102	.146	.096	.162	.105
Bbls c-1 spot ....lb.	.094	.098	.092	.098	.142	.092	.158	.101
Tanks ....lb.	.088	.092	.086	.092	.134	.086	.15	.093
Menhaden Tanks, Baltimore .gal.	.21	.22	.21	.22	.50	.21	.52	.45
Blown, bbls NY ....lb.	.07½	.08	.07½	.08	.09	.07½	.09	.09
Extra, bleached, bbls NY..gal.	.47	.49	.52	.53	.70	.52	.70	.70
Light, pressed, bbls NY ...gal.	.36	.38	.36	.38	.64	.36	.64	.63
Yellow, bleached, bbls NY.gal.	.39	.41	.38	.40	.67	.38	.67	.66
Mineral Oil, white, 50 gal bbls ....gal.	.40	.60	.40	.60	.60	.40	.60	.40
Russian, gal ....gal.	.95	1.00	.95	1.00	1.00	.95	1.00	.95
Neatsfoot, CT, 20° bbls NY .lb.	.15¼	.16	.15¼	.16	.17⅜	.16¼	.19	.18¼
Extra, bbls NY ....lb	.09	.10	.09	.10	.11⅛	.09½	.13½	.12
Pure, bbls NY ....lb.	.11	.12	.11	.12	.13⅛	.11½	.15¼	.13½
Oleo, No. 1, bbls NY ....lb.	.07½	.08	.07½	.08	.12½	.08⅞	.11½	.10¾
No. 2, bbls NY ....lb.	.06½	.08	.06½	.08	.11	.08⅛	.11¼	.10
No. 3, bbls NY ....lb.	.08	.09	.08	.09	.10½	.09	.10½	.09¾
Olive, denatured, bbls NY ...gal.	...82	.85	...82	.85	1.00	.70	1.40	1.05
Edible, bbls NY ....gal.	1.75	2.00	1.75	2.00	2.00	1.75	2.00	1.95
Foots, bbls NY ....lb.	.06½	.06¾	.06½	.06¾	.08	.06	.11½	.08⅛
Palm, Kernel, Casks ....lb.	.05¾	.06¼	.05¾	.06¼	.08¼	.06	.09	.08
Lagos, 1500 lb casks ....lb.	.05⅛	.06	.05⅛	.06	.07¾	.05¾	.09	.07½
Niger, Casks ....lb.	.05	.05¼	.04¾	.05¼	.07½	.05½	.08¾	.07
Peanut, crude, bbls NY ....lb.	.....	Nom.	.....	Nom.	Nom.	.....	Nom.	.....
Refined, bbls NY ....lb.	.12	.14	.12	.14	.15	.12	.15	.14½
Perilla, bbls NY ....lb.	.10	.11	.10	.11	.14½	.10	.20	.15
Tanks, Coast ....lb.	.07¾	.08	.07¾	.09	.11¼	.08	.15⅜	.13
Poppyseed, bbls NY ....gal.	1.70	1.75	1.70	1.75	1.75	1.70	1.75	1.70
Rapeseed, blown, bbls NY ...gal.	.71	.73	.71	.73	1.00	.74	1.04	1.04
English, drms. NY ....gal.	.....	.75	.....	.75	.82	.75	.90	.82
Japanese, drms. NY ....gal.	.56	.58	.56	.58	.70	.56	.88	.72
Red, Distilled, bbls ....lb.	.08⅜	.09	.08⅜	.09	.10⅜	.08⅝	.11¼	.10⅛
Tanks ....lb.	.07½	.08¼	.07½	.08¼	.09¼	.07¾	.10½	.09¼
Salmon, Coast, 8000 gal tks..gal.	.....	Nom.	.....	Nom.	.44	.42	.44	.42
Sardine, Pacific Coast tks ...gal.	.18	.19	.18	.19	.42	.18	.51	.45
Sesame, edible, yellow, dos ...lb.	.09½	.10¾	.09½	.10¾	.12	.09	.12	.11¾
White, dos ....lb.	.....	.10	.....	.10	.12½	.10	.12½	.12½
Sod, bbls NY ....gal..	.....	.40	.....	.40	.40	.40	.40	.40
Soy Bean, crude........								
Pacific Coast, tanks ....lb.	.07	.08	.07	.08	.09¼	.07	.10⅞	.09
Domestic tanks, f.o.b. mills, ...lb.	.065	.07	.065	.07	.08⅛	.07	.10½	.08¼
Crude, bbls NY ....lb.	.073	.08	.073	.08	.10¾	.10	.12¾	.11¼
Tanks NY ....lb.	.074	.08	.074	.08	.09¾	.09	.11½	.10½
Refined, bbls NY ....lb.	.08	.09	.08	.09	.13½	.13	.13½	.13¼
Sperm, 38° CT, bleached, bbls NY ....gal.	.84	.85	.84	.85	.85	.84	.85	.84
45° CT, bleached, bbls NY gal.	.79	.80	.79	.80	.80	.79	.80	.79
Stearic Acid, doubie pressed dist bags ....lb.	.09½	.11	.09½	.11	.15	.13½	.18½	.15¼
Double pressed saponified bags ....lb.	.10½	.12	.10½	.12	.15½	.14½	.19	.15¾
Triple, pressed dist bags ..lb	.12	.14	.12	.14	.17	.15½	20½	.17¾
Stearine, Oleo. bbls ....lb.	.08¼	.08¾	.08¼	.08¾	.09½	.08¼	.12	.09¾
Tallow City, extra loose ....lb.	.03¾	.04	.03¾	.04	.07⅜	.04¾	.08⅜	.07
Edible, tierces ....lb.	.04⅞	.05	.04⅞	.06	.09¼	.05½	.10½	.08
Tallow Oil, Bbls, c-1 NY ...lb.	.07⅞	.08¾	.07⅞	.08¾	.11	.08½	.12	.10¾
Acidless, tanks NY ....lb.	.07⅞	.09	.07⅞	.09	.10	.08¼	.11	.09¾
Vegetable, Coast mats ......lb.	.06	Nom.	.06½	Nom.	Nom.	.06½	Nom.	.08
Turkey Red, single bbls ......lb.	.09	.10	.09	.10	.12	.10	.12	.11
Double, bbls ....lb.	.12	.13	.12	.13	.16	.13	.16	.14
Whale, bleached winter, bbls NY ....gal.	.....	.74	.....	.74	.74	.74	.80	.74
Extra, bleached, bbls NY..gal.	.77	.77½	.77	.77½	.76	.76	82	.76
Nat. winter, bbls NY ....gal.	.71	.72	.71	.72	.73	.73	.78	73

Index to Advertisers

"We"—Editorially Speaking

No attempt of ours could dramatize more forcibly the folly of governmental operation of Muscle Shoals than did the following editorial in the *New York Evening Sun*, appearing February 24, under the title, "Not Even A Lunch Room":

"Simple and neat is the question asked by Representative O'Connor of Oklahoma when, after referring to a restaurant in the Senate wing of the Capitol, he said: 'They lost $76,000 last year. If the Government cannot run a restaurant or a barber shop, how are they going to run Muscle Shoals ?'

"The answer, as everybody knows, is that the Government probably would run Muscle Shoals less efficiently than the Senate restaurant is run. The Post Office ran last year at a loss of about $91,000,000. This year the deficit may be as great as $150,000,000. Yet the Post Office is the one job the Government has done best.

"These are considerations advocates of public ownership lightly brush aside. Taxpayers do not regard them so lightly."

It is currently reported that two of the major executives of the chemical industry are running fast, with their coats off and their tongues out, trying to catch up with their own publicity.

Discussing the wisdom of the policy of helping the Russians set themselves up in the chemical business—a topic that bobs up quite frequently when two or three chemical executives gather together—one purveyor of chlorine said to another the other day:

"Whatever shall we do when they get those 150,000 cells working."

"That would be just the finest thing the Soviet Government could possibly do."

And they debated hotly for five minutes before they discovered that the one was discussing electrolytic cells while the other believes that the only cells that will ever operate successfully in Russia are prison cells.

Chemical industry has long enjoyed the reputation (not entirely undeserved either) of being excessively secret, highly esoteric, quite the last word in modern industrial necromancy. During last month's sudden and welcome upspurt of the stock market, Wall Street puzzled quite a bit over a trio of chemical mystery stories that for their short day were best sellers among the rumor mongers. Just what was the nature of the decline that forced the hard-working President of Allied to take an extended vacation ? What is the "conversion formula" of American Solvents shares in terms of molasses ? How much did the famous Alkali War cost and on what front were the casualties heaviest ?

We have admired the job Howard Nieman is doing with our neighbor and contemporary, *The Textile Colorist*. However, he has made a grievous mistake in the last issue. We quote, "Old Uncle Joe Cannon once remarked that what this country needed most were better five cent cigars."

For shame! To rob that lasting honor from the late Vice-President Marshall. In our system of government, witticisms of our vice-presidents should be protected by copyright laws. How else will we ever remember them ? To ease the blow on the usually meticuously correct *Textile Colorist*, we admit full accord with the last deduction in the editorial, "What this country needs more than anything else are fewer five cent Congressmen and more million dollar employers."

Along with fewer five-cent Congressmen we need a thorough reorganization of the federal government's staff and a live personnel. Do you remember that Vice-President Marshall was also once reported to have said, that in his time in Washington he had seen many a plain bureau grow into a parlor and bedroom set. To paraphrase the words of the humorist about the weather, whose sayings are so well known as to leave no room for dispute as to who first said them, "Everybody talks about fewer and better congressmen and governmental bureaucy, but no one ever does anything about it."

Julius Klein, Assistant Secretary of Commerce is the author of ten commandments for business men struggling with the throes of depression and we repeat them. They are well worth your time.

"Don't blame the depression for everything which has marred the tranquility of the economic scene," was the first.

The others were:

"Don't compare peaks with slumps.

"Don't fall into the fallacy of expecting the wage earner to bear the brunt of readjustment. Talk of drastic slashes in American living standards border closely on lunacy.

"Don't cut loose from associated activities in business.

"Don't ignore the amazing power of the new technology.

"Don't cut marketing research.

"Don't overlook the stabilizing value of foreign markets.

"Don't fall into the perils of the mass production mania. Quantity operations are by no means assurance of quantity profits.

"Don't overlook the perils of obsolete equipment.

"Don't be stampeded by unfounded rumors."

Marketing research, foreign markets, the mass production mania and the perils of obsolete equipment are of particular application to the chemical industry at this time.

From the February 24, issue of the New York Times—"The measure, which creates the 'Muscle Shoals Corporation of the United States,' provides that, 'all members of the board shall be persons that profess a belief in the feasibility and wisdom...of producing fixed nitrogen for sale to the farmers, and by reason thereof the corporation may be a self-sustaining and continuing success'." We rise to ask, where are such men to come from ? Our acquaintanceship extends to a number of men, whose training, knowledge, and business experience fit them to undertake the supervision of manufacturing fixed nitrogen. Not one of them could fill the bill as laid down—simply because not one of them could, or would profess to a "belief in the feasibility and wisdom" of government ownership and operation of fertilizer plants.

BY-PRODUCTS

When you write to the Government for geranium seeds, don't forget to ask for a carton of nitrogen fertilizer from Muscle Shoals, which we, the people of the United States, will soon be owning and operating.

New York Times.

With apologies to Ripley, believe it or not, Tuesday, February 24, 331 stocks made new highs and 4 new lows for the year 1931 or longer.

Every time the hands of the clocks in the House and Senate Chambers move forward one hour the Treasury is out about $1,400. My, what a charge for hot air!

COMING FEATURES

"Research and Patents"
Dr. Joseph Rossman

A symposium of opinions from chemical research leaders on the degree of protection afforded by patents.

"Cost Accounting in Chemical Industry"
L. Staniforth